NOV 26 1912

AMERICAN ARTISAN and Hardware Record

64. No. 21. CHICAGO, NOVEMBER 23, 1912. $2.00 Per Year.

TRADE B&C MARK

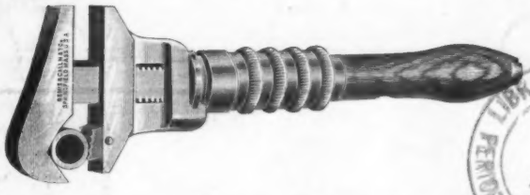
BEMIS & CALL WRENCHES

TRADE B&C MARK

HAVE been the choice of the skilled mechanic for more than three-quarters of a century. Each wrench is a specialty—a masterpiece of the tool maker's art. A wrench for every purpose and each bears the stamp of quality, strength, long service and convenience.

New B. & C. Adjustable Auto Wrench

Strong and handy. Straight handle. Appeals to the automobile trade. Made in sizes ranging from six to fourteen inches. All parts interchangeable with our "S" nut wrench.



No. 45. Comb. Nut and Pipe Wrench

Takes the place of two tools. Has an extra long nut or sleeve so that in making adjustments, the whole hand may be used. This protects the thread and allows a firmer grip on pipe work.

No. 62. Improved Screw Wrench

Is strictly a "heavy duty" wrench. Has several new and important features. Bar is oval, front and back, giving additional strength. Handle, frame and bolster all one piece. All parts are carefully case-hardened.

No. 48. Adjustable "S" Nut Wrench

is positively the "handiest" wrench ever made. For use in corners and confined places it is indispensable. Five sizes. Has large nut that can be turned with the thumb of the hand that holds wrench.

Show the "B. & C." Wrenches to your high grade trade. They'll sell on sight.

Catalog No. 20 will be mailed on request. Write for it today.

BEMIS & CALL HARDWARE AND TOOL COMPANY

Established 1835 **SPRINGFIELD, MASS.**

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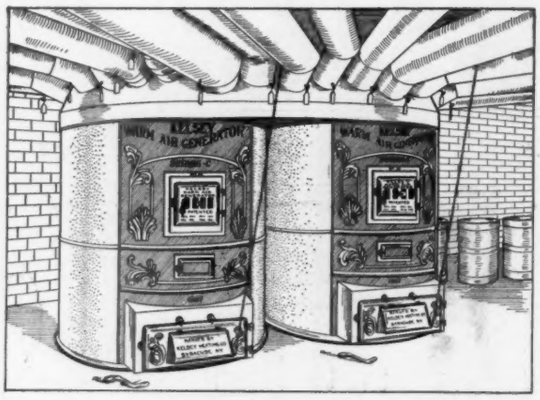
ALPHABETICAL INDEX AND CLASSIFIED LIST OF ADVERTISERS, PAGES 46 AND 47

The KELSEY Engineering Department



Battery of Two Generators under one dome casing. Twenty-six heat conducting pipes.

A Sure Proof

of the greater interest in Warm Air Heating and in Kelsey Heating and Ventilating, in particular, is in the wonderful increase in the number of blue prints of architects' plans of fine residences that have been sent in this year to our Engineering Department for plans and estimates of cost.

Good Big Profitable Contracts

have been secured by many dealers for residences, churches and schools through the help of the Kelsey Engineering Department.

Why Not Call on Us

when you want to get the good business?

Kelsey Heating Co.

New York Office: 156 Fifth Avenue

Syracuse, N. Y.

Now sold direct to the trade west of Chicago

The SEARCHLIGHT UTILITY

RETURN FLUE HEATER

Radiates heat from every square inch of its entire surface

Illustration shows Mr. J. B. Howard regulating the combustion damper. This is the only damper used on the Searchlight. No direct damper used.

No useless nickel trimmings that stop the heat in the **Searchlight** It will positively heat the same amount of space with three tons of coal as the so-called base burner using five tons. Why? Because the **Searchlight** burns the gases which are absolutely lost in every other base burner on earth.

The Searchlight has the Famous J. B. Howard Combustion. This alone is the secret of its tremendous sale.

If you want to make large profits, more sales and have pleased customers, then send **today** for **Searchlight particulars.**

The Utility Stove & Range Co.

216 BOARD OF TRADE BLDG. INDIANAPOLIS, IND.

THE PYRAMID FURNACE

is equipped with the famous **Pyramid Grate.** This new grate will appeal to you if you are familiar with the faults and weaknesses of other furnaces. Burns any kind of fuel. But with soft coal or the cheaper grades of slack and "mine run" it will produce as much heat as the ordinary furnace burning the same amount of hard coal. Let us describe in a few words the principles of

The Pyramid Grate

The grate lies flat. When new fuel is supplied, the long lever at the side is moved slightly forward. This raises the center of the grate and forces the red hot coals against the walls of the firepot, leaving a space in the middle of the fire for the fresh fuel. When the new coal is added it is then surrounded by a ring of red hot coals. All gases and smoke, which otherwise would pass up the flue, are now consumed in the combustion chamber before they have a chance to escape.

Every year we furnish hundreds of Pyramid Furnaces that go into homes where ordinary furnaces have failed. The big issue of the day is Economy, and that is the strongest point in favor of the Pyramid Furnace.

Let us send you our catalog and prices

Forest City Foundry & Manufacturing Co.

Cleveland Stock Clay | Cleveland Stock Clay

THE "QUALITY" LINE

A new and complete line of modern stoves and ranges, made in all sizes and styles, for every fuel, all of the same quality—the very best. Let us introduce this low-priced modern heater, the

BANNER QUALITY OAK

Body of the stove is made of cold rolled steel. The body is attached to firepot by a solid cast flange with cast ring. This is bolted down on edge of the body, making it impossible for body to warp or buckle. Has a large swing feed door with screw draft register. Large ashpit with base door fitted with screw draft register.

Foot rail, top rim, name plate, draft registers, and handles are nickelplated. Just enough nickel parts to "set it off."

Order a sample today. It will introduce you to the real value of the "Quality" Line.

QUALITY STOVE & RANGE CO.

BELLEVILLE

ILLINOIS

A-B New Idea GAS RANGES

Always please the ladies. They are modern, clean and sanitary, with large roomy ovens and plenty of shelf room. A large variety of sizes and styles to suit every purse.

DEALERS.—The gas range business belongs to **you.** Don't let the gas companies get all the business. With a moderate priced line such as the **A-B** you can crush all competition. By comparison all other ranges are old style and awkward. Set up a sample on your floor.

SHALL WE SEND A CATALOG?

A-B Stove Company

Battle Creek, Michigan

EVERY RETAILER

should secure a copy of

AMERICAN ARTISAN ADVERTISING MANUAL

Experts agree that it is a book of inestimable value to those who wish to prepare advertisements that will bring results.

Read their opinions as given below:

From "DOMESTIC ENGINEERING," Chicago.

"The book is of undoubted worth as an aid to the retail merchant in preparing that desirable but illusive style of advertising copy known as 'printed persuasion.'"

From "NATIONAL HARNESS REVIEW," Chicago.

"Its pages teem with salient points concerning texts, typographical displays and other essentials which go into the make-up of a business getting announcement."

From "PRESTO," Chicago.

"It would be impossible to estimate the value of the book to hardware merchants."

From "TRADE," Detroit, Mich.

"This book is thoroughly practical."

From "BUFFALO EXPRESS," Buffalo, N. Y.

"It contains many reproductions of successful advertisements."

From "THE WEEKLY IMPLEMENT TRADE JOURNAL," Kansas City, Mo.

"It is a reproduction of the retailers adverments and criticisms of same."

From "FARM IMPLEMENT NEWS," Chicago.

"It is a compilation of all kinds of display advertisements as they actually appeared in different newspapers."

From "THE HOUSEFURNISHING REVIEW." New York

"This book is useful to the ad man."

From F. R. SWITZER CO., "SUCCESSFUL ADVERTISING." Utica, N. Y.

"We have glanced through THE AMERICAN ARTISAN ADVERTISING MANUAL, and it certainly ought to be of considerable interest to the retail hardware trade, and we think you deserve considerable credit for the undertaking."

From "THE THRESHERMEN'S REVIEW," St. Joseph, Mich.

"A very effective monitor of retail advertising." "It should be a very valuable book for the dealer who wants newest ideas and best methods of expression in ad writing."

From "THE METAL WORKER" New York

"THE ADVERTISING MANUAL will be found of assistance to stove dealers, sheet metal workers, plumbers, hardware men and all who seek to extend their business by advertising."

From "THE TRADESMEN," Chattanooga, Tenn.

"If the average hardware or stove dealer, to whom this book should prove of especial benefit, had some assistance in the preparation of his advertising copy, he would be able to prepare advertisements at all times that would be of the business getting kind."

It should have a place in every store.

Improve your advertising, Mr. Dealer. AMERICAN ARTISAN ADVERTISING MANUAL will aid you. Secure a copy today.

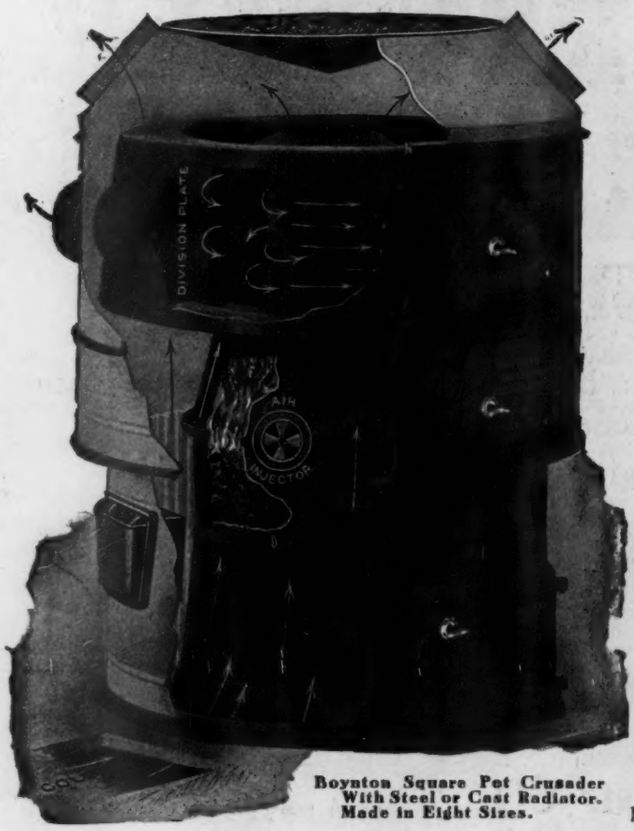
The book retails at $3.50, and it can be obtained from your bookseller or from

DANIEL STERN

PUBLISHER

537 South Dearborn Street, Chicago

YOU CANNOT AFFORD



Boynton Square Pot Crusader
With Steel or Cast Radiator.
Made in Eight Sizes.

Mr. Dealer, to delay any longer in looking into the possibilities and the selling advantages of the **SQUARE POT** line of furnaces and boilers. Hundreds of dealers from one end of the country to the other are now selling **SQUARE POT** Heaters and getting the cream of the business

A post card will bring you catalog and descriptive matter

Why Not Investigate?

BOYNTON FURNACE CO.

NEW YORK CHICAGO JERSEY CITY

There's no secret about the popularity of the

"FRONT RANK" STEEL FURNACE

It simply sells easily and **stays sold.** But there's a **reason.**

We have no case on record where a **"Front Rank" Furnace** has worn out. They can't wear out. Made of heavy armor plate with only one seam and riveted closely like a boiler, they are absolutely gas and air tight. Large twin radiators give an exceptionally long flue travel. Positively the cleanest furnace on the market. Specially equipped for burning soft coal.

An army of 14,000 satisfied users in St. Louis alone is a pretty strong endorsement. You can have satisfied customers if you install **"Front Rank" Furnaces.** We guarantee satisfaction.

If you are a live progressive dealer, we would like to submit a new proposition to you. May we?

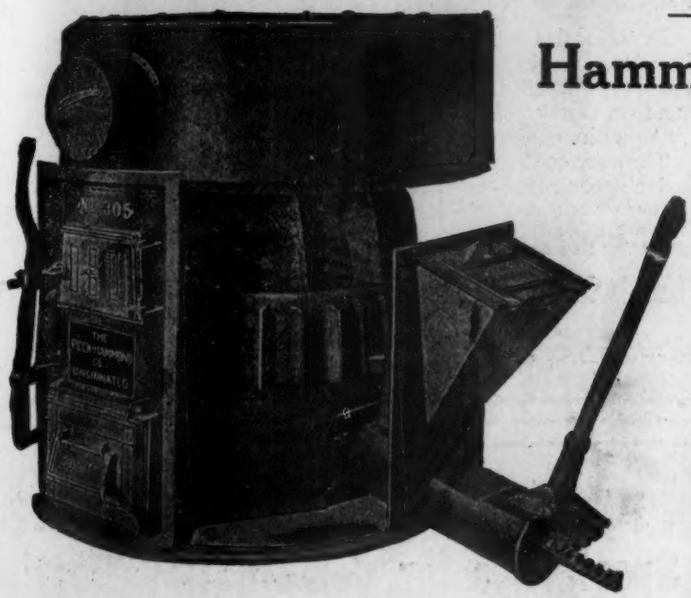
HAYNES-LANGENBERG MANUFACTURING CO.

4045-4057 Forest Park Boulevard, - ST. LOUIS, MO.

Save Your Money by Saving Your Fuel

——USE THE——

Hammond Underfeed Furnace



All fuel forced in under the fire, the proper place for fuel to enter the fire box and not on top of the fire where 50% of the combustible products in the fuel get out of range of the combustion temperature before being consumed and is thus wasted, passing up and out of the smoke stack.

Every part of the fuel must pass directly through the fire insuring greater efficiency in the **HAMMOND UNDERFEED** than in any other modern furnace.

Locomotives consume about one-third more coal than would be necessary if the fire could be fed without opening the doors and cooling off the combustion chamber.

In the **HAMMOND UNDERFEED** this defect has been remedied and, at the same time eliminated the nuisance of Smoke, Dust and Dirt from the operation of feeding.

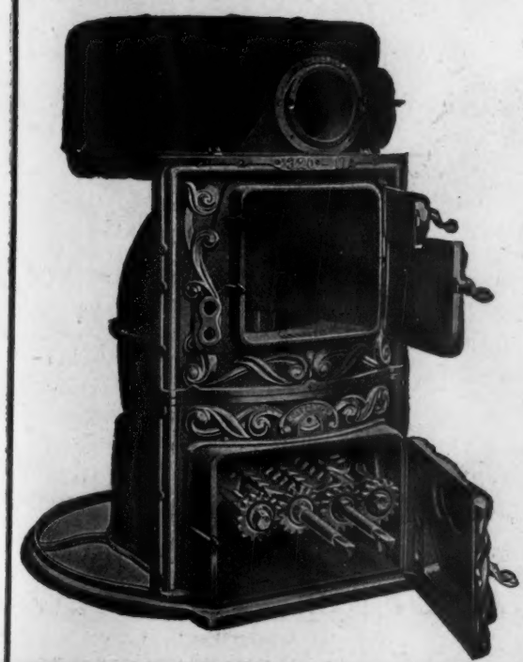
Our catalog will tell you how easily it is operated. Write for it, NOW!

THE PECK HAMMOND CO. :: :: Cincinnati

THE NEW AJAX

Made with 18, 20, 22, 24, 26 and 28 inch **straight** fire pots.

Enlarged Dimensions More Radiation Increased Capacities



LARGE DOUBLE FEED DOOR
for burning Soft Coal or Wood.

LARGE CLEAN-OUT DOOR
making it easy to clean radiator.

INCREASED GRATE SURFACE
insuring more heating capacity.

ENLARGED CASING DIAMETER
guaranteeing greater volume of warm air.

Write for 1912 Pamphlet illustrating and describing The New Ajax. Also for prices and terms.

CO-OPERATIVE FOUNDRY CO.
ROCHESTER, N. Y.

——WESTERN BRANCH——
505 So. Clinton St., (PHONE HARRISON 6373) CHICAGO, ILL.

Sell "FLORAL CITY" FURNACES

and Enjoy—Quick Sales, Good Profits and Satisfied Customers.

Why? Because—

In "Floral City" furnaces we offer to the trade the most complete line of high grade furnaces on the market. They have an earned reputation for efficiency. They are backed with a guarantee by a firm thirty years in the business. This firm is a "known quantity"—a pioneer in the manufacturing of heating furnaces.

They are sold through dealers only and these dealers have exclusive agencies for the different territories allotted to them.

The firm behind them absolutely guarantee satisfaction and prompt service. There are other reasons. A letter from you will bring them, together with our catalog and best discount.

THE MONROE FOUNDRY & FURNACE COMPANY
Monroe, Michigan

"KING"—Our largest seller and one of the best furnaces on the market today It is not newer than the rest, it is different, though.

"ALAMO" Furnaces and Hot Water Specialties for Combination Heating

CHARLES SMITH, 24 West Lake Street, Chicago, Illinois

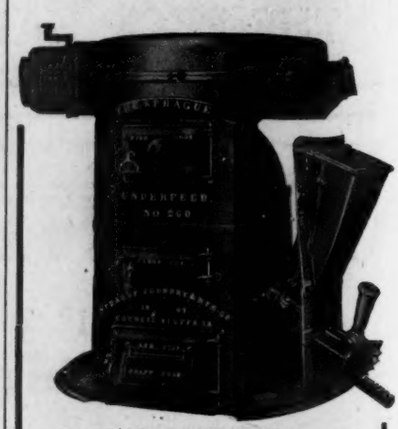
OURS DO! DO YOURS?

Do your customers boost for you? They should; if you please them. It's human nature. They do boost for *GILT EDGE* Dealers and they will for you. Each sale means more advertising—advertising of the highest kind; the kind you can't buy—the recommendation of a pleased user.

That is the *GILT EDGE* way. Try it this year.

Get Our Catalog and Proposition

R. J. SCHWAB & SONS CO.
293 CLINTON ST. MILWAUKEE, WIS.



GO AFTER IT

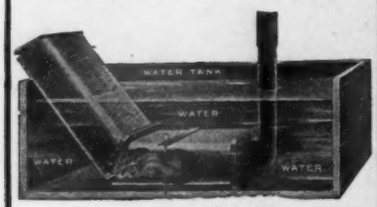
The agency for the furnace built on new principles—the best furnace on earth.

Sprague Underfeed Furnace

For fuel economy it has no equal. The new **Underfeed Grate** will surely interest your trade. Send to-day for descriptive matter and prices to the trade. Also ask about special inducements to agents.

Sprague Foundry & Mfg. Co.
COUNCIL BLUFFS, IOWA

NELSON
SUBMERGED
TANK HEATER



Showing position in water tank with grate and fire exposed and the heat current passing under the water, which heats all the water quickly and saves fuel.

Now in use in 25 states by farmers and stock raisers.

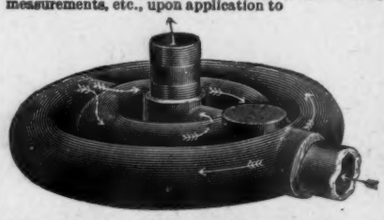
You should have a sample of this heater on your floor.

Catalog and prices on request

Nelson Mfg. Co.
Deerfield, Wis.

The Champion Combination Hot Water Boiler

One or more sections can be used together according to the amount of radiation to be used. The fire passing through spaces between rings in each section and over their large surfaces permits the direct action of the fire to come in contact with each section, making a powerful and effective heater. CHAMPION BOILERS are tested 100 pounds hydraulic pressure before leaving the factory and are guaranteed not to leak. Will increase every dealer's business who handles them. Prices, measurements, etc., upon application to



Frank D. Stolz Co.
Manufacturers
1210 Webster Ave. Chicago, Ill.

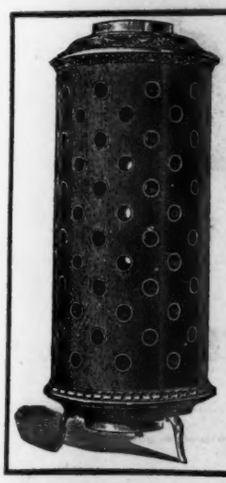
NOW READY

The New SCHEIBLE FURNACES

all cast iron. Burning any fuel. Our new catalog, just off the press, tells all about them. Write for it TODAY.

The Scheible-Moncrief Heater Co.

1444 West Ninth Street :: Cleveland Stock City



OVER 150,000 OF THE

Rochester Radiators

in actual use is the best proof of its excellence and usefulness.
Fits any stove or furnace burning HARD or SOFT COAL, WOOD or GAS.
Guaranteed not to choke or clog the draught.
They are easily cleaned.
We refuse to sell to your customers if you carry our radiators in stock.
Prices from $2.00 to $12.00 according to size and finish.
Can fit any pipe from 4½ to 9 inches in diameter.
It will give more heat with the same amount of fuel or it will SAVE HALF THE FUEL and give the same amount of heat.
Our furnace size radiators can be used either in basement, heating room above, through a floor register, or in room above if smoke pipe extends into room, warming hall or room without any expense.

Rochester Radiator Co.

120 Furnace Street - - - Rochester, N. Y.

THE

MONCRIEF

TOP RETURN FLUE WARM AIR FURNACE

is made of *all cast iron.* Built on extra heavy lines. A furnace that always gives satisfaction. Burns hard and soft coal economically—is free from faults and weaknesses.

Descriptive Matter Sent on Request

T. E. Henry Furnace Co.

825-29 Long Ave., N. W.
829-30 Champlain Av., N.W. Cleveland Stock City

The advertising pages, which many persons seem to accept as a necessary evil accompanying the paper, are one of the greatest educational features of the trade journal. A broad education cannot be had without a good knowledge of the various kinds of apparatus used in power plants and it usually happens that the man who is best informed of what is to be had and where to get it quickly and cheaply generally makes a wise selection and his services are recognized in a substantial manner. The advertising pages serve as a silent, but persistent educator on the latest designs, constructions and adaptations of machinery of all kinds. The knowledge gained from the advertising pages, probably in the majority of cases, is acquired wholly unconsciously without the least mental exertion and wholly unaware that a valuable addition to one's general knowledge of engineering is being made. In this connection it should be remembered that manufacturers who present nothing but the more recent designs of very latest types are sure to be found.—Domestic Engineering.

Smith's Hot Water Specialties

THE largest and most complete line of hot water attachments, for furnaces, steam and hot water boilers, ever manufactured.

Every one carefully and accurately rated. Made in a great variety of sizes and with tapping so arranged that they may be used in **any** furnace, steam or hot water boiler. Each has some particular feature that makes it especially adaptable to the job on which it is used.

Send for the big new catalog showing the heaters illustrated above and several other styles we make. Ask for prices to the trade.

Do it **today—NOW.**

Chas. Smith Co., 57 West Lake St., Chicago, Ill.

It is Well to Remember
That we SPECIALIZE in one Thing:
Furnishing You With

REPAIRS

FOR ANY AND ALL

Stoves, Ranges and Furnaces

We can ship on short notice, give you the best of service and quote the lowest prices. A trial will convince you.

A. G. BRAUER SUPPLY CO.

316-318 North Third Street, St. Louis, Mo.

Has the original positive lock joint.

Can be assembled in shortest possible time—without tools.

Furnished at a lower cost than if you tried to make it yourself.

These are some reasons in favor of

HANDY FURNACE PIPE

Universally acknowledged as the peer of all double wall pipe.

A sample of **Handy Pipe** made of the same material as our regular pipe will be sent free on request.

Handy Furnace Pipe and Fittings are carried in stock by all the leading jobbers in the West, at factory prices. For samples and catalogs write direct to manufacturers.

F. MEYER & BRO. CO., :: Peoria, Illinois

Carter's Improved Double Header

For heating two rooms on the first floor. Nearly every job has at least one or two places where this register may be used. Just install one and note the time you save and the satisfaction it gives.

The upper part of grill is detachable. The wing is attached to this part of grill and may be removed and dusted. Wing is worked with either hand or foot.

Our catalog describes this and other improved registers. Write for it.

Waterloo Register Company, Waterloo, Iowa

100 TINNERS' PATTERNS

COMPLETE FOR **$1.00**

Sent Postpaid on Receipt of Price.

DANIEL STERN,
837 South Dearborn St. CHICAGO.

REGISTERS

THAT'S OUR ONLY BUSINESS EVERY WORKING DAY OF THE YEAR

and **registers** you must have if you do Furnace work.

Then why not get the best article on the market —**a register** that can be placed in position in a jiffy?

Grill can be removed in an instant to permit cleaning interior, without the aid of any tools—"not a screw to remove."

Let us send you a catalogue and prices. Let us do it now.

SYMONDS REGISTER COMPANY
1102-1104 Madison Street ST. LOUIS, MO.

BOOKS FOR SALE

☞ The publisher of AMERICAN ARTISAN will take pleasure in supplying Books of whatever character, at catalogue prices, prepaid by express, to any address, on receipt of price. The following are in lines especially represented by this journal.

NO BOOKS EXCHANGED

SHEET METAL WORKING

TINNERS' HELPER AND PATTERN BOOK.

By H. K. Vosburgh. Rules, diagrams, tables, 123 pp. 53 figures. Price, $1.00.

GRAY'S PERFECT ELBOW PATTERNS

On heavy blue print paper. Set A—From one inch to 20 inches, 80 patterns; price $1.50 prepaid. Set B—From 20 inches to 40 inches, 80 patterns; price $1.50 prepaid. Sets A and B together, and Angle Chart; price $3.00 prepaid.

XXTH CENTURY SHEET METAL WORKER.

By H. E. Osborne, a practical sheet metal worker. A brand new book. Just off the press. Exactly what its title implies—a XXth century treatise on sheet metal work. Price, $1.00, cloth bound; 60 cents, flexible cover.

SHEET METAL WORKERS' GUIDE.

A collection of rules and diagrams, for describing the most useful patterns ordinarily required, preceded by chapters on Sheet Metal Work, Soldering, Geometry as applied to Sheet Metal Working. By W. J. E. Crane. Price, postpaid, 60 cents.

SHEET METAL WORKERS' INSTRUCTOR.

Comprising Geometrical Problems and Practical Rules for ..ribing the Various Patterns required by Zinc, Sheet-iron, ..pper and Tin-plate Workers. By R. H. Warn. New edition, revised and enlarged by J. G. Horner, A. M. I. M. E. Crown 8vo., 254 pp., with 430 illustrations. Cloth. Price $3.00.

GRAY'S PERFECT SKYLIGHT PATTERNS

On heavy blue print paper. Set C—For Hip, Gable and Single Pitch Skylight Paterns, for one and one-half inch bar, including a complete set of 6, 8 and 10 inch Ventilator and Base Patterns; price $3.50 prepaid. Set D—Same with two and one-half inch bar, and 12, 14, 16 and 18 inch Ventilator and Base Patterns; price, $4.00. Set E—Same with three and one-half inch bar, and 20, 22, 24 and 26 inch Ventilator and Base Patterns; price $4.50.

TIN, SHEET IRON AND COPPER PLATE WORK.

This is a work of the greatest value to all who work in sheet metal. It describes the method of laying out nearly everything which the metal worker will be called upon to make. Joints, elbows and all kinds of kitchen utensils are fully described. The work is supplemented by rules for mensuration and hundreds of valuable receipts. By L. J. Blinn. This book contains 296 pages with 169 illustrations, bound in cloth. Price, $2.50.

THE CORNICE WORK MANUAL

Is a 240-page book, illustrated with 184 engravings. It is thoroughly indexed and attractively gotten up, with substantial red cloth covers, embossed in gold. Chapters treat of The Cutters' Bench, Drawing Tools and Angles, Cutters' Tools, The Entabulature, The Reading of Drawings, The Measuring of Cornices, Estimating, Right Angle Mitre Patterns, Bracket Patterns for Panel Sections, Right Angle Return Mitre Patterns, Patterns for a Pediment and Their Development, Patterns for a Segmental Section of a Pediment, Details and Patterns for a Finial, Bracings and Fastenings of Cornices to Buildings, Staging and Scaffoldinng for Cornice Work, Ornament Stamping Machine, The Management of Ropes and Hoisting Tackle, Plan and Details of a Gable and Horizontal Cornice, Detail of Slating and Slaters' Tools, Details for Horizontal and Raking Mitre Patterns and the development of Details and Patterns of the Turrets. Price, $3.50.

THE WORKSHOP

HINTS FOR PAINTERS, DECORATORS AND PAPER HANGERS.

How to Mix Paints. Price, 25c.

A PRACTICAL COURSE IN MECHANICAL DRAWING.

By Wm. F. Willard. Invaluable to the shop. Shows how to draw and lay out patterns for sheet metal workers and tinsmiths. Price, 50 cents.

MANUAL OF RECEIPTS.

By Sidney P. Johnston. Contains 241 pages, giving 1,718 receipts for soldering, polishing, painting, hardening, writing on, nickeling, whitening, unguilding, varnishing, turning, testing, cleaning, mending, marbling, lacquering, japanning, cementing, coating, decorating, graining, annealing and amalgamating the various metals. It occupies a field of its own. Price, $3.50.

HEATING AND VENTILATION

FURNACE HEATING.

A practical and comprehensive treatise on warming buildings with hot air, with an appendix on furnace fittings. By Wm. G. Snow. Cloth. Price, $1.75.

HEATING AND VENTILATION

STEAM AND HOT WATER FITTERS' TEXT BOOK

Prepared for the Steam and Hot Water Heating Course at the New York Trade School, with Supplementary Chapters on House Heating, Specifications and Surface Estimating. By Thos. E. McNeil. 140 pages, numerous illustrations and diagrams. 5x7 in., cloth. Price, $1.00.

HANDBOOK FOR HEATING AND VENTILATING ENGINEERS.

Well arranged book covering all classifications of Ventilation, Humidity and Heat Losses, Furnace Heating, Hot Water and Steam Heating, Plenum Warm Air Heating, Mechanical Vacuum Heating, District Hot Water and Steam Heating, Electrical Heating, Temperature Control. (By James D. Hoffman, M. E.) 4½x6¾ in. 320 Pages. Price, $3.50.

HOT-WATER HEATING, STEAM AND GAS FITTING, ACETYLENE GAS—HOW GENERATED AND HOW USED.

For Plumbers, Steam Fitters, Architects, Builders, Apprentices and Householders. Containing Practical Information of all the Principles Involved in the Construction of Steam, Hot Water, Acetylene Gas Plants and how to properly do Gas Fitting. By Jas. J. Lawler. Revised by Geo. C. Hanchett Large 12mo., cloth, elegantly illustrated. Price, $2.00.

HOT WATER MANUAL.

With Information and Suggestions on the best methods of Heating Public, Private and Horticultural Buildings. Treatise on the High and Low Pressure Systems, Bath Apparatus, Hot Water Supply for Public Institutions. Duplicate Boilers, Radiators, Laundry Drying Stoves, Swimming Baths, Turkish Baths. Causes of and Hints to prevent Failure. By Walter Jones. Price, $3.50.

HEATING BY STEAM AND WATER.

A practical treatise on House Heating, describing improved methods of installing heating apparatus in the home, and giving short and accurate rules for computing radiation, heat losses, etc.; with graphic charts, showing boiler power and coal consumption, and accurate data, consisting of charts, illustrations and descriptions of how to heat water for baths, swimming pools, etc., etc. Two hundred and sixty-eight original drawings. By Chas. B. Thompson. Handsomely bound in cloth. Price, $3.00.

ADVERTISING

AMERICAN ARTISAN ADVERTISING MANUAL

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EUGENE MUNSELL & CO.

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68 Church Street

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AND LEADING JOBBERS EVERYWHERE

THE STANDARD FOR HIGH GRADE STOVES

YALE
Russia Finish, pat. Lock
STOVE PIPE

It is made of a very high grade of uniform color Blue Polished Steel and is coated to prevent rusting. Made in all sizes. Packed twenty-five and fifty joints to case. For sale by the Jobbing Hardware Trade Throughout the United States.
Mfg. by HEMP & CO.
ST. LOUIS, MO.
In the event of your jobber does not handle this pipe send your inquiries to us.

THE GEO. W. COPE STOVE PATTERN WORKS
COR. BRUSH AND WOODBRIDGE Sts.
DETROIT, MICHIGAN

PATTERNS
FOR STOVES AND HEATERS
First-Class in Wood and Iron
VEDDER PATTERN WORKS
Established 1835 TROY, N. Y.

PATTERNS
For Stoves and Heaters
The Cleveland Castings Pattern Co.
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DESIGNS and ESTIMATES FURNISHED FOR ALL KINDS OF STOVE PATTERNS
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for STOVE PIPES AND ALL SHEET IRON WORK
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for RADIATORS, PIPES, ETC.
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NICKEL PLATE STOVE POLISH CO., Mfrs.
CHICAGO

STOVE TRIMMINGS
Knobs, Bolts, Towel Rods, Towel Bars, Chaplets, Ring Bands
TRY US FOR SERVICE AND QUALITY
FANNER MANUFACTURING CO.
SEND FOR CATALOGUE
Cleveland Stock Cut
WRITE FOR PRICES

The COOPER
Oven Thermometer
is found on all the first class ranges. For over twenty years it has been the standard of oven thermometers. Accurate, reliable and always a good selling feature for a range. Can be used on any style stove or range.
Write for prices.
The Cooper Oven Thermometer Co.
Pequabuck, Conn.

(One-half actual size.)

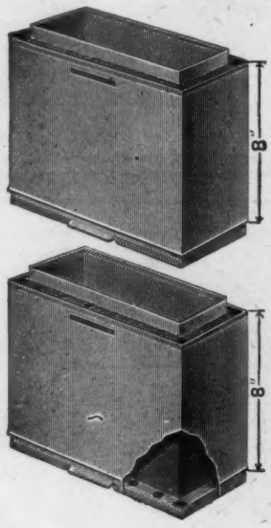
PERSISTENT ADVERTISING

ONE who watches carefully the pages of general advertising mediums is struck by two things: the persistency with which those advertisers who are recognized as successful maintain their advertising week after week, month after month, and year after year; they never seem to abate their effort, and apparently the volume of their business increases steadily. The other thing noticeable is the large number of advertisers who thrust their announcements above the surface for a little while and then sink into oblivion. They either had not merit as a basis for their claims or they did not possess the skill to steer their enterprise successfully, or else they lacked the nerve to put forth proper effort.
—ADVERTISING EXPERIENCE.

MICHIGAN
SAFETY FURNACE
PIPE

Michigan Safety Furnace Pipe Ready to Connect

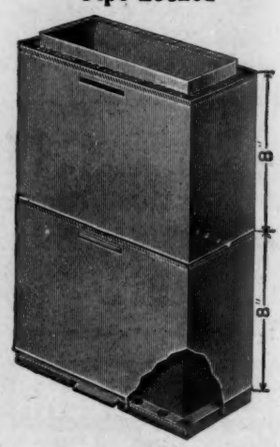
SEE THAT SLOT



SEE THAT HOOK

is now made with an **Automatic Locking Device** that reduces the labor at least 50%. This is a genuine lock—not an ordinary slip joint. The pipe is connected and locked at the same time, and when locked it is impossible for the sections to come apart.

Michigan Safety Furnace Pipe Locked



Michigan Safety Pipe

has but one point of entrance. Outer and inner walls have separate connections. A stack of Michigan Pipe may be tipped slightly and still both walls would remain connected. This is a feature the installer will appreciate.

You can leave your tools and solder in the shop when you install Michigan Safety Furnace Pipe

All reliable jobbers sell it. Ask to see how it is made. Or, better still—send to us direct for a free sample. That will tell you more than any description. Write us today.

Made Only by the

MICHIGAN SAFETY FURNACE PIPE CO.

COR. BROOKLYN AND ABBOTT STREETS - DETROIT, MICHIGAN

ESTABLISHED 1880.

AMERICAN ARTISAN & HARDWARE RECORD

Representative of the Stove, Tin, Hardware, Heating and Ventilating Interests.

PUBLISHED EVERY SATURDAY.

TERMS OF SUBSCRIPTION IN THE UNITED STATES AND ITS POSSESSIONS, (Invariably in advance): ONE YEAR, POSTAGE PAID, $2.00.
FOREIGN COUNTRIES, ONE YEAR, POSTAGE PAID, $4.00.
CANADA, ONE YEAR, POSTAGE PAID, $3.00.

Address all Letters, Communications, and Remittances to

DANIEL STERN, PUBLISHER AND PROPRIETOR,
537 SOUTH DEARBORN STREET, CHICAGO, ILL.

Entered as Second-Class Matter June 25, 1885, at the Post Office at Chicago, Illinois, under Act of March 3rd, 1879.

CHICAGO, NOVEMBER 23, 1912.

THE PUBLISHER TAKES PLEASURE IN MAKING THE ANNOUNCEMENT THAT AMERICAN ARTISAN AND HARDWARE RECORD WILL BE SENT FREE OF CHARGE FOR THE REMAINDER OF 1912 TO NEW SUBSCRIBERS FOR THE YEAR 1913. YEARLY SUBSCRIPTIONS RECEIVED NOW WILL BE CREDITED TO THE END OF THE YEAR 1913.

Ending the Abuse of Advertising.

FOR the purpose of putting a stop to various fraudulent advertising throughout the country, many cities have organized committees which have taken active steps to enforce the laws there are in this country dealing with this. The Board of Directors of the Boston Chamber of Commerce has issued authority to the governing board of the Retail Trade Association to form a corporation for the purpose of enforcing these laws and in various other centers similar steps are being taken. In the majority of states there seem to be several laws upon the statute books to take care of any unfair competition which may arise from this fraudulent advertising, but the main difficulty appears to rest with the enforcing of these laws.

It must be admitted, however, that there is some advertising which skates along very close to the edge of fraud without falling definitely into that classification, and yet such advertising certainly belongs in the category of unfair competition. A recent law passed in Denmark is much more rigid in its provisions than the majority of those in existence in this country. This distinctly prohibits any untrue advertisements being placed before the public. It has a provision prohibiting any more than two Clearing Sales a year by any firm. Exceptions are made in case a bankrupt stock is to be sold or the death of a partner or owner shall cause the closing out of the business "below cost," or if a bona fide winding up of the business is undertaken, or if the place of business is to be removed to another locality, etc. If, however, any of the above exceptions can be shown not to have been true a criminal prosecution is possible. The law furthermore contains penal clauses for persons who are found guilty of using false descriptions of goods offered for sale, of employing false business names or firms in carrying on trade, and the like.

Similar legislation has recently been effected in Germany and other countries, and if it can be enforced in its entirety business as a whole should be distinctly the gainer.

Labor Unions and the Sherman Law.

ONE of the most interesting things which was discussed during the past week at the convention of the American Federation of Labor in Rochester, New York, was the relation of the Sherman Law to Labor Unions. When this legislative act came into being it was popularly supposed to be aimed solely at the big corporations; consequently, organized labor received a shock from which it has apparently not yet recovered when the batteries of the Sherman Law were turned against them. A few weeks ago the first great blow fell when the United Hatters of North America were ordered by the United States Court of Connecticut to pay D. E. Loewe & Co. $240,000 damages, besides costs amounting to a total of $260,000, because they advertised the Loewe hats as unfair. The case has been in court nine years and a decision was rendered against the hatters once before, when they were ordered to pay Loewe $222,000 damages.

The principle was upheld that unions are amenable to damages for boycotting, under the Sherman act. Then the District Court of Connecticut was instructed to collect the money and hand it over to Loewe. Now the case is being again appealed to the Court of Appeals. The trials already have cost nearly a hundred thousand dollars and it is expected that this sum will be exceeded a great deal before the appeal is decided.

Of course, immediately after this decision there was, as might be supposed, the usual outburst of exclamations against the oppression of the laboring classes, but the majority of people think that the Sherman Law should be made retroactive, if it is used at all. It is no more fair for Labor Unions to oppose the wheels of progress by tying up business through unfair methods than it is for a big corporation. Progress and prosperity are at stake. Both sides to the labor controversy must observe all the rules of fairness. Both can exert tremendous power in the right direction, but it must be by fair methods. The majority of persons whose viewpoint is unbiased, unprejudiced, look at the present instance as being rather a good moral lesson.

Foreign Competition In Iron and Steel.

IF THERE is one thing upon which Americans have always prided themselves, it is the supremacy which American iron and steel have always held in the markets of the world. Therefore, certain data which has recently been collected should arrest the attention of those who are interested in the question of the relative competitive strengths of the various countries. Strange to say, the nations which are making the most en-

croachments upon American exports of iron and steel are China and India.

At this particular time the development of the iron and steel industry in these two countries should not be overlooked. Chinese pig-iron, according to reports, has captured the Pacific Coast markets. Alabama pig-iron was formerly sold on the Pacific Coast in large quantities, but it has been shown that this market is now lost to the Southern pig-iron producers, for the reason that Chinese pig-iron can be delivered to the Pacific Coast points—with duty paid—for several dollars per ton less than the lowest price which American producers can name.

The cheap coolie labor of China and India is largely responsible for the low cost of production. Labor is as cheap as 32 cents per day in India and, consequently, in the countries which are adjacent to India, pig-iron is being sold for less than the cost of production in the United States. Some figures recently shown by consular reports show that the Hanyang Iron Works at Hankow, China, have been enlarged and are now under the direction of Japanese financial men, who are producing with considerable success large quantities of finished steel products, including steel rails, bores and structural steel of all kinds.

In China the wages paid to laborers average from 16 cents to 18 cents per day, and it is reported that $5.00 in United States money will pay the daily wages of thirty Chinese laborers in these iron works. Of course our Chinese exclusoin law prevents any of the importing of this cheap labor in this country, but the very fact that they are able to make use of this kind of labor in China and to produce the material which will, it is said, stand competition, makes it inevitable that this foreign produced steel and iron will find its way soon into American markets in considerable quantities, and certainly it is making its influence felt already in the export business of this country.

Labor-Saving Machinery a Help to Progress and Prosperity.

EVERY time a labor-saving device has been introduced on the market, or a special machine developed which would do the work of several men, there has been a loud wail of protest from the laboring men of this country, calling attention to the fact that prosperity cannot take place with the cutting off of the wages of so many men. There has been a noticeable lack of such complaints during the past year or so, despite the fact that labor-saving appliances were never more in evidence than at the present time, and this may largely be attributed to the fact that the people themselves are commencing to realize that wherever a machine or appliance is installed to do the work of a certain number of men, it means that much of an increase in production, and the manufacturers are able to largely increase their output. Therefore, if the field of production is not already overcrowded, prosperity is bound to result from the new machinery, and in the end more men are employed than formerly, because development in one line inevitably carries other lines on the same way of progress.

Even if this were not the case, there is no reason why the American manufacturer should continue to use antiquated and inferior equipment when he is enabled to cut down their operating and producing expenses by installing new appliances. Before the railway appeared, the stage coach was considered the highest possibility in the way of transportation over land. When the railway was first introduced, its effect was to drive out of business the stage coach and the small wayside inn, both carrying employment to a considerable number of people, but it wasn't long before the railroads themselves were employing many times the number of men who were displaced.

The same loud cry of protest went up when the sewing machine was invented and when the various machines connected with the printing business were developed, but both have opened their respective fields so enormously that the total number of persons employed directly as a result of these inventions is enormous. It must be considered when reviewing this question that it is only by scientifically reducing the cost of production that certain things are brought within the reach of many more people. By enlarging the market for them there is a vastly increased volume of consumption. This in turn increases the demand for labor, and greater prosperity is the result.

Combining the Business and Social Life.

A FEW years ago it was the invariable custom when a young man first put his foot upon the threshold of business life to caution him against the dangers that lurked in the form of too much social enjoyment. It was argued, and undoubtedly with a great deal of good, substantial reasoning, that a young man could not make the most out of his life if he gave up too much valuable time to social affairs. There is no doubt that the social end can be overdone in a great many cases, but the change of viewpoint from the old to modern times is rather interesting.

It is now brought forward quite frequently that, whatever we do for a living, it is necessary for all to have recreation and social intercourse of the right kind, and, provided temperate use is made of social opportunities offered to business and professional men, they will go back to the cares and troubles of business life much refreshed. For a young man especially, the social world is invaluable, in that it allows him to broaden his acquaintances and brings him in touch with people who may be in a position afterward to do him a great deal of good.

What has prejudiced most people against social affairs of various kinds is that they start late in the evening and generally continue until morning, and a young man who endeavors to attend too many of them before long finds himself a nervous and physical wreck, or he will neglect one part of his life to follow the other. Generally it is the business life which must suffer.

There is a pronounced and active agitation at the present time in favor of plenty of play. It is considered just as valuable to play with all your might at the proper time as it is to work with all your might when that is necessary, but sociability must cease to be synonymous with idleness, and, provided the individuals who are interested in certain people socially can be brought to realize that the business futures of the latter are of some consideration and will restrict

their gatherings for the benefit of the industrious rather than the idle classes, the chances for success of the former will not be jeopardized, and it will be possible for many of those who now abstain from social pleasures to avail themselves of their opportunities in this direction.

RANDOM NOTES AND SKETCHES.

BY SIDNEY ARNOLD.

The list of "human ostriches" is growing. A reader sent me a clipping the other day from an English newspaper reporting the death of a woman due to a long continued diet of nails and pins. This woman, a mulatto aged 33 years, was admitted into an asylum for acute mania ending in dementia seven years ago, but she had never had any signs of disease of the digestive system. She was often seen to pick up nails and pins, but was never seen to swallow any. At the autopsy the stomach stretched down to the left in the form of a long pouch, in which lay a mass of foreign bodies, weighing five pounds, and consisting of more than 1,400 nails, screws, thimbles and other objects. Some other foreign bodies had made their way through the wall of the stomach and had caused the formation of adhesions.

* * *

In Central America they do not shout "Swat the fly!" They eat the fly. They pound the insects together in a mortar and bake them in little cakes which probably resemble our currant and fruit cake. It is said to be too rich for the average traveler's blood. Capt. Amundsen found dog flesh palatable, though rather tough, and seal flesh as good as first class beef. Epicures during the siege of Paris did not object to well nourished sewer rats. If we were only less squeamish, the problem of flies and rats would become a pleasant solution which would lessen household expenses. And yet such is American tendencies—there would soon be rat barons and fly trusts—and again prices would soar skyward.

* * *

Charles Graham of the Graham Nut Company, Pittsburgh, Pennsylvania, was discussing the subject of snobbishness recently and said: "There was a young woman in a certain dancing class who thought a great deal about ancestry and descent, and there was a young man who thought that all such stuff was snobbish. The two sat out a dance together, and the girl mounted her hobby almost at once.

"'What was your father?' interrupted the young man.

"'Father was a gentleman.'

"'But what did he do for a living?'

"The young man thought that smart, but the girl came right back:

"'What was your father?' she asked.

"'My father raised hogs.'

"'I see he did. But what did he do for a living?'"

* * *

I have been looking over the first issue of the *Y. S. and T. Magazine*, which is the name of the house organ of the Youngstown Sheet & Tube Company, and find it is crammed full of interesting and original matter. The thing that most caught my eye, however, was the following:

The Busy Man's Creed.

I believe in the stuff I am handing out; in the firm I am working for, and in my ability to get results. I believe that honest stuff can be passed out to honest men by honest methods. I believe in working, not weeping; in boosting, not knocking; and in the pleasure of my job. I believe that a man gets what he goes after; that one deed done today is worth two deeds tomorrow, and that no man is down and out until he has lost faith in himself. I believe in today and the work I am doing; in tomorrow and the work I hope to do, and the sure reward which the future holds. I believe in courtesy, in kindness, in generosity, in good cheer, in friendship and in honest competition. I believe there is something doing, somewhere, for every man ready to do it. I believe I'm ready—

RIGHT NOW!

* * *

Life brings to each his task, and whatever art you select—algebra, painting, architecture, poems, commerce, politics—all are attainable even to the miraculous triumphs, on the same terms of selecting that for which you are apt—begin at the beginning, proceed in order, step by step. 'Tis as easy to twist iron anchors and braid cannons as to braid straw; to boil granite as to boil water; if you take all the steps in order. Wherever there is a failure there is some giddiness, some superstition about luck, some step omitted which nature never pardons.—*Emerson.*

* * *

Something of the ancient spirit plainly lingers in Greece, according to a newspaper report, for a Dutch steamboat company which had christened a new ship Charon has had to change the name to Jason to persuade Greek dockers to work on her. I had almost forgotten that old Charon was supposedly pilot of the ferry across the Styx, but I fail to see where Jason is much of an improvement for the latter went through some pretty stormy adventures.

* * *

The meanest of all men who edit
Are those who clip and don't give credit.—*Judge.*

Nay, meaner still are those who range
Our stuff and credit to "Exchange."—*N. Y. Mail.*

Nay—him who sees another's breaks
And prints them as our own mistakes.
—*Western Trader.*

You three are wrong; you make us laugh.
The worst disgrace to all our craft
Is he who always drives us daft
With this, in the 'steenth paragraph—
"says the *American Paint and Oil Dealer.*"

Please don't omit the one whose memory fails
When e'er a clipping he does seize, and later hails
Our journal in a manner complimentary
Under the name, "An esteemed contemporary."

News Siftings

THE PUBLISHER TAKES PLEASURE IN MAKING THE ANNOUNCEMENT THAT AMERICAN ARTISAN AND HARDWARE RECORD WILL BE SENT FREE OF CHARGE FOR THE REMAINDER OF 1912 TO NEW SUBSCRIBERS FOR THE YEAR 1913. YEARLY SUBSCRIPTIONS RECEIVED NOW WILL BE CREDITED TO THE END OF THE YEAR 1913.

The Model Stove & Mfg. Co., Carthage, Missouri, has been consolidated with the Queen Bee Stove Co. at Tulsa, Oklahoma, and the combined shops will be in operation shortly.

The building formerly occupied by the Blair Glass Co., Richmond, Virginia, is being remodeled for the Cameron Stove Co., which will install its plant when the repairs are completed.

The Howard Stove Co. of Beaver Falls, Pennsylvania, are now using electric motors throughout their plant, having discarded their steam power plant. They buy their current from a local power company, finding this entirely satisfactory.

The plant of the Syracuse Stove Works, Syracuse, New York, has been purchased by the Palmer-Moore Co., who bid $20,000 for the stove works buildings at a recent bankrupt sale. They will use the plant for manufacturing a light motor delivery truck.

The Porceliron Co., Manufacturers of enameled steel ranges, kitchen tables, etc., and the Ingram-Richardson Mfg. Co., of Beaver Falls, Pennsylvania, will shortly be consolidated, the firm name of Ingram-Richardson Mfg. Co. being retained. They are now building a new factory, which will give them over 9,000 feet of floor space.

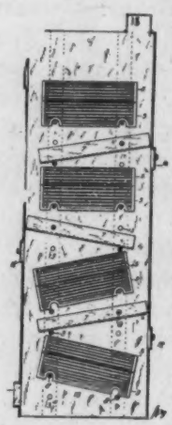
The Howard Stove Works, of Omaha, Nebraska, have purchased the entire stock, machinery and fixtures, of the Iowa Stove & Range Co., Waterloo, Iowa, for $4,500 at a bankrupt sale, the plant having been appraised during the bankruptcy proceedings at over $8,000.00. The Howard Stove Works propose to dismantle the factory and move everything to their present plant at Omaha.

F. M. Borden & Bro., 118 North Second St., Philadelphia, Pennsylvania, Wholesale Distributors of "Novelty" Stoves, Ranges and Furnaces, have sent out a postal announcement to the trade, stating that although the Abram Cox Stove Co., who manufacture the "Novelty" Stoves, Ranges and Furnaces, suffered a severe fire recently, fortunately the main foundry, warerooms and shipping departments were not damaged, and that their stock, together with the large stocks F. M. Borden & Bro. keep on hand, will prevent any delay in shipment.

The Leonard Hi-Oven Range Co., of Cedar Rapids, Iowa, is a recent incorporation, organized for the manufacture of Leonard Hi-Oven Ranges. The machinery for their line is now being installed in a building which they have rented for their factory and they expect to begin operations at a very early date. The company anticipate a large sale for their Ranges, particularly as all of the stockholders are retail stove dealers, who will push the line vigorously. A meeting of the Board of Directors has just been held, those in attendance being Geo. H. Ilten, Cedar Rapids; S. F. Parzybok, Vinton; H. H. Rath, Tipton; F. D. Smid, Cedar Rapids; H. D. Van Zant, Pella; M. M. Morrow, Mt. Vernon; D. M. Jones, Williamsburg, and J. E. Leonard, Cedar Rapids.

WESTERN MAN INVENTS STOVE.

William Frank Pinkerton of Denver, Colorado, has been granted United States Patent No. 1,044,239 for a stove he invented last year. The patent is for a stove consisting of a casing, a fire-cage constructed of a bottom fuel-supporting grate and having arches extending transversely. There is a middle portion or grating which forms a cage resting upon the bottom grate and having recesses which are adapted to receive the arches of the latter. The cage rests in an upright position upon the grate, and there is an upper grate portion having diverging sides and attached to and supported upon the middle portion. The whole fire-cage thus formed is arranged within the casing, and rods passing through the latter serve for support of the cage. These rods are adapted for vertical adjustment to vary the inclination of the cage.



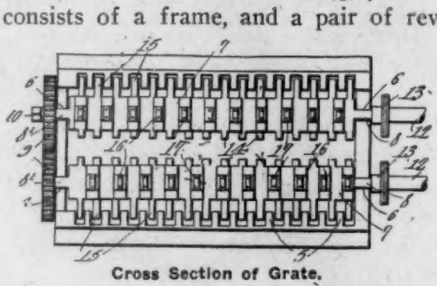
Newly Invented Stove.

ELECTRIC LIGHT BULB SETS FIRE TO AUTOS

A novel fire was reported during the past week, when Alderman Victor A. Rossbach's garage at 1220 Ridge Avenue, Chicago, two automobiles and a lot of furniture were destroyed by fire, while the chauffeur, Gustave Johnson, had a narrow escape. Johnson was at work under one of the machines when the electric light he held in his hand dropped to the stone floor and the bulb exploded, setting fire to some waste. He had just time enough to roll from beneath the car when the flames shot to the gasoline tank. The fire was so rapid that by the time the fire engines arrived the garage had been destroyed. The loss is estimated at $11,400.

NEW COMBINATION GAS AND COAL GRATE.

To Michael L. Scanlon, Cleveland, Ohio, has been granted United States Patent No. 1,043,871 on a grate which consists of a frame, and a pair of reversible hollow grate bars mounted in the frame and operatively connected to rotate simultaneously in opposite directions. The grate bars have lugs along their sides, and rows of staggered outlet nozzles between. The lugs are designed to pass between each other when the grate bars are reversed.



Cross Section of Grate.

SUCCESSFUL SALESMANSHIP IS INTELLIGENT SALESMANSHIP.

BY L. F. SIMON.

The person who sells merchandise these days must be a successful salesman. There is no room for any other class. Webster defines a salesman as "one whose occupation is to sell goods or merchandise." That is probably a good dictionary definition, but it does not cover the full scope of successful salesmanship.

Successful salesmanship is intelligent salesmanship and that means satisfied customers, which is the sole aim of every reputable retail firm. No matter how hard the head of a concern works, if the customer does not get intelligent service the store will be injured instead of building up a substantial patronage.

I am a firm believer in the schooling of salesmen. No matter what class of goods is handled, the persons in the selling end of the business must be thoroughly trained to know the policy of the house and must have a perfect knowledge of the stock before they can be classed as succesful salesmen. The object of such training is to bring the policy of the firm to its customers through the sales force. Unless they carry out their instructions to the letter the patrons do not get the satisfactory service the store is trying to give them.

I make it my business to be on the floor as much as possible; it is stimulating to the salesmen, and enables us to know their strong and weak points. Saturday is usually a busy day in all clothing stores, and that is when the true test of salesmanship comes. The rush is so great that we are compelled to put on extra salesmen.

Sometimes a man goes into a clothing store to buy a suit and the salesman, either because of lack of knowledge or through indifference, puts a wrong size on the customer, although the right size is there, and then persuades him to buy it. Such things may happen anywhere.

That is where so many salesmen make mistakes—they do not take enough interest in the customer, or they lack knowledge and training. If that customer purchases the ill fitting suit he will be dissatisfied and the store probably will lose a customer. That is why it requires intelligent service to make successful salesmen.

A salesman above all else must be a good judge of human nature, capable of deciding at a glance the temperament and peculiarities of customers. He must know how to approach and how to talk to persons of every class. He must have confidence in his own ability and in the merchandise he is selling, otherwise he cannot convey that confidence to his patrons.

He must avoid all arguments and must know what to say and when to say it. Some persons require a great deal of "selling talk"—others very little. A successful salesman knows intuitively when the psychological moment has arrived to close a sale. The unsuccessful salesman keeps on talking and the customer goes away without buying.

A salesman should familiarize himself with his surroundings and know every detail of the stock he is handling. Otherwise he will not be in a position to show goods in an intelligent and satisfying manner.

He should meet his prospect pleasantly, look him straight in the eye, ascertain his wants as quickly as possible, and do everything he can to aid the buyer in making a judicious purchase. No matter how exacting a customer may be, he should be accorded the same courteous treatment given to one who buys quickly. Time spent in showing goods is never wasted, whether a sale results or not.

In our store we try to get men of the highest class as salesmen, men who have these qualities of mind. We are always willing to pay such men all they are worth. We want men who can serve our customers as well as serve us.

The successful salesman never attempts to force a sale. It is bad business, and nine times in ten results in dissatifaction for the customer. Many good sales and good customers have been lost forever to a house by the use of such methods.

Above all, a salesman should be honest and straightforward in all his dealings. Never misrepresent an article in order to make a sale. Look to the customer's interest first, last and all the time. Serving their interest best means serving your employer better. To be well served means to be well satisfied, and a satisfied customer is the upbuilder of business.

While it is probably true that the most successful salesman in any line are those who start at the bottom and learn the business from the stock room up, I do not believe that is true in all cases. Not all good salesmen start at the bottom of the ladder. I have always contended that salesmen are born—not made.

If a salesman is successful in handling one line there is no question that he can make good in any other if he makes an intelligent study of it.

No successful firm can afford to hire inexperienced salesmen, for the simple reason that such men are not in a position to give the trade that intelligent service which is necessary, and which people demand and to which they are entitled.

A NEW DEVICE FOR OPENING AND CLOSING STOVE APERTURE.

United States Patent No. 1,044,061 has been granted to Henry Lange of Quincy, Illinois, for a stove. This patent covers a stove having an opening and a

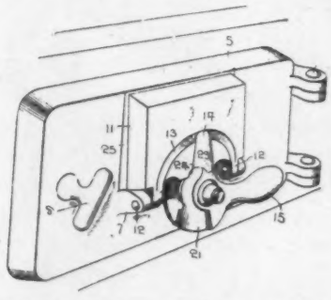


Illustration of Stove Opening and Shutter.

closure for the opening which is pivoted to the stove on a plane below the opening. The closure is adapted to be swung in a vertical plane, and there is an actuator pivoted to the stove below the closure, which is so attached that it can be swung into operative relation with the closure for opening and closing.

AMERICAN ARTISAN

LANDON P. SMITH,

Someone said to us the other day, "If you want to know anything at all about hardware, ask Landon P. Smith," and after mature reflection we have concluded that our informant was right for Landon P. Smith is a regular "Hardware Encyclopedia." There are two ways of making money in hardware, one of which is to inherit an established business and mix up a little luck with the management of it, and the other is to acquire experience by actually going through the mill and apply that experience later on.

Mr. Smith adopted the latter method and as he passed hrough the various stages of his career, useful hardware knowledge stuck to him like iron filings adhere to a magnet. To look at his suave, smooth, tranquil and affable countenance, one would scarcely imagine that he had had much intimate acquaintance with the hard things of life (this pun slipped in unintentionally) but that his path had been cast in pleasant and peaceful lines undisturbed by a ripple of ill fortune.

Yet those who know Landon P. Smith best realize that the genial president of the Smith and Hemenway Company has forged his way to the front ranks of hardware men through sheer ability to overcome any obstacles in his path. Back of his quiet smile, there is an iron determination and when this is added to the wonderful fund of knowledge which has given him the nickname of "Hardware Encyclopedia" there can be no doubts as to his success being fully merited. His personality has helped wonderfully in creating the demand for the "Red Devil" tools.

Mr. Smith was born in the city of Memphis, Tennessee, on May 24, 1868, and a kindly Fate early directed his attention to hardware. At the age of 12 years he entered the employ of Des Jardines, Miller and Root, hardware dealers at 298 Main Street, Memphis, and remained with them some time to acquire the fundamentals of hardware. After leaving this firm, he associated himself with the A. F. Shapleigh Hardware Company in St. Louis, leaving them in 1893 to help organize Smith, Herlitz & Company, Importers of Hardware. In 1895 this establishment was succeeded by Smith and Patterson and this latter firm in turn was followed in 1898 by the Smith and Hemenway Company, 150-152 Chambers Street, New York City.

At the time of organization and for several years afterward the Smith & Hemenway Company acted as Manufacturers' Agents, but in 1904 they commenced to manufacture the line of tools which under the trade name of "Red Devil" are now being sold all over the world. At the present time the company is manufacturing about 95 per cent of the goods which it handles. The success of the Smith and Hemenway Company may be attributed very largely to the powerful personality of its president and his knowledge. If our veracity is doubted by anyone, let that one ask Landon P. Smith a question some time and he will learn more from this human "Hardware Encyclopedia" than he could by searching the heavy volumes on his book shelves. Assuredly no one is more eligible for a place in hardware archives.

HALL OF FAME

WALLACE L. POND.

Why is it that a man's profession does not always fit his nature? The law of contrasts holds good in the life callings of men as well as in other places. Thus we find a loud, bullnecked, husky sort of a fellow who according to disposition and general appearance ought to have been a member of Captain Kidd's crew, occupying a chair in some university or even occasionally speaking from a church pulpit, while a meek, timid, shrinking sort of soul is often picked for positions which would seem to require men of daring. Now our general impressions of a man in the file business, if we had never met one, would be that his disposition should be cynical, caustic, biting, sarcastic, corresponding to the general relation of a file to other hardware articles. A dyspeptic or confirmed grouch might also fill the bill. But look over the field of file manufacturers of today and see just how many answer to these attributes. The law of contrasts is getting in its best work.

Wallace L. Pond of the Nicholson File Works, Providence, Rhode Island, is a living example of this little bit of moral philosophy. Instead of absorbing the attributes of a file he has gone to the other extreme and we find the present Sales Manager of this big company to be genial, approachable and full of those qualities which help to cement life-long friendships.

Brooklyn, Connecticut, points with pride to the fact that it was his birthplace, for here on February 8, 1872, he first opened his eyes to the great big world. Even in his infancy his nurse makes affidavit that he had none of the rasping qualities of voice which many squalling infants employ to make life miserable for their parents, although it is said he cut his first tooth on a Nicholson file.

However, some way or other files appeared on the horizon and made a strong appeal to him, for in 1895 he joined the sales force of the Nicholson File Works at Providence, Rhode Island, where he immediatey made good, receiving various boosts in salary and territory until he was made Sales Manager which position he occupies today. He has a host of friends in the hardware field and many admirers as well (the two classes of acquaintances being altogether different) and his advice is often sought on matters of moment.

At the Atlantic City Convention on October 25th last he was elected a member of the Executive Committee of the American Hardware Manufacturers' Association. For recreation he "jined the navy," or in other words became a member of the Baptist church and is a prominent layman of that denomination. He confines his local activities to the Cranston Street Baptist Church of Providence, and besides his church work is recognized as a prominent citizen of Providence. He has very mature judgment and executive ability to a marked degree and is never found in the rear in any gathering of hardware men. Having been with the Nicholson File Works for seventeen years, it is no wonder that his opinions are recognized as having some weight. Those who know him (and their number is legion) look for big things yet to come from Wallace L. Pond within the next few years.

The Hardware Record.

AMERICAN ARTISAN AND HARDWARE RECORD is the only publication containing western hardware and metal prices corrected weekly. You will find these on pages 44 to 49 inclusive.

THE PUBLISHER TAKES PLEASURE IN MAKING THE ANNOUNCEMENT THAT AMERICAN ARTISAN AND HARDWARE RECORD WILL BE SENT FREE OF CHARGE FOR THE REMAINDER OF 1912 TO NEW SUBSCRIBERS FOR THE YEAR 1913. YEARLY SUBSCRIPTIONS RECEIVED NOW WILL BE CREDITED TO THE END OF THE YEAR 1913.

The Iceless Refrigerator Co. of Cleveland, Ohio, have recently increased their capitalization from $200,000 to $300,000.

The announcement comes from Wikleman, Arizona, that that town is very anxious to have a first-class hardware store locate there.

Fco. Villiers Furze, Casilla Correo, 1911, Buenos Aires, Argentine, South America, is interested in securing the agency for various hardware lines and specialties.

The Black Manufacturing Company of Detroit, Michigan, of which Frank A. Black is president, has recently been organized to manufacture small hardware and bookcases at Milford.

The many friends of H. O. Spencer of the Richards-Wilcox Mfg. Co. of Aurora, Illinois, will be glad to know that, after his illness, he is now quite improved in health and back on the job again.

City Purchasing Agent Callow of Cleveland, Ohio, is figuring upon establishing a municipal hardware store where householders may obtain articles at cost or a little more than cost. Only the preliminary details have been worked out as yet.

The Household Utensil Company of Chicago, Illinois, has been incorporated with a capital of $2,500 to manufacture and deal in vacuum washers and cleaners, household utensils, etc., the incorporators being Harry A. Biossat, Robert E. Beaubien and Henry L. Rexford.

The California Hardware Co. of Los Angeles, California, will lease a new four-story brick warehouse, which is now being erected for them in that city at the southeast corner of Alameda and First Streets. The main building will be 126x150 feet, and there will be a one-story wing, 140x126 feet.

Owing to the bubonic plague scare in Vera Cruz, Mexico, there is at present an extraordinary demand for rat traps, particularly the wire-cage trap, as it catches the rats alive, and also, as stated by the United States Consul in a recent report, it is possible to catch them in greater numbers than by any other form of trap.

The Amherst Hardware Co. of Elyria, Ohio, has been recently incorporated with a capitalization of $35,000. The incorporators are George Menz, C. G. Ashenbach, A. A. Plato, J. J. Mahoney, W. J. Bodman and Hugh Finnegan. It is understood that this concern will move into the building now occupied by J. Wesbecher, and open up about January 1 if some improvements they contemplate are completed by that time.

The American Hardware Corporation, which recently purchased the Universal Screw Company of Hartford, Connecticut, has announced that the latter company will be run as an independent company, along the same lines as in previous years. The following directors have been elected: Clarence A. Earl, F. Goodwin Smith, Colonel C. L. F. Robinson of Hartford, S. C. Dunham and Colonel Charles M. Jarvis. The following officers have been elected: President, Clarence A. Earl; secretary and treasurer, F. Goodwin Smith.

PITTSBURGH HARDWARE DEALERS HOLD INTERESTING MEETING.

TO AMERICAN ARTISAN:

The regular monthly meeting of the Pittsburgh Retail Hardware Dealers' Association was held at the Fort Pitt Hotel on Friday evening, November 15. A report was made by Secretary Klauss of the Reception Committee, who stated that there would be at least 600 people present at the reception and dance which will be held on November 20.

Mr. H. M. Kirk of Newcastle, Pennsylvania, one of the district chairmen in the Pennsylvania Retail Hardware Association, was present and gave a very interesting talk on several subjects. Mr. John F. Howe, a member of the National Executive Committee, was also present at this meeting. His address was especially interesting, owing to the fact that he was in attendance at the recent secretary's meeting at Chicago. A resolution was adopted at this meeting that the Official Bulletin, published at Argos, Indiana, the official organ of the National Retail Hardware Association, should be published weekly instead of monthly, as at the present time. Those present believe that it would bring them in close touch with the work of the association, and other matters in general. At the present time, on account of this publication being published monthly, a great deal of the news is more or less stale when it reaches the retail dealers, owing to the fact that the live weekly trade journals have been on the job two or three weeks in advance with the same information.

LOUIS J. HECKLER,
Pittsburgh, Pennsylvania. Secretary.

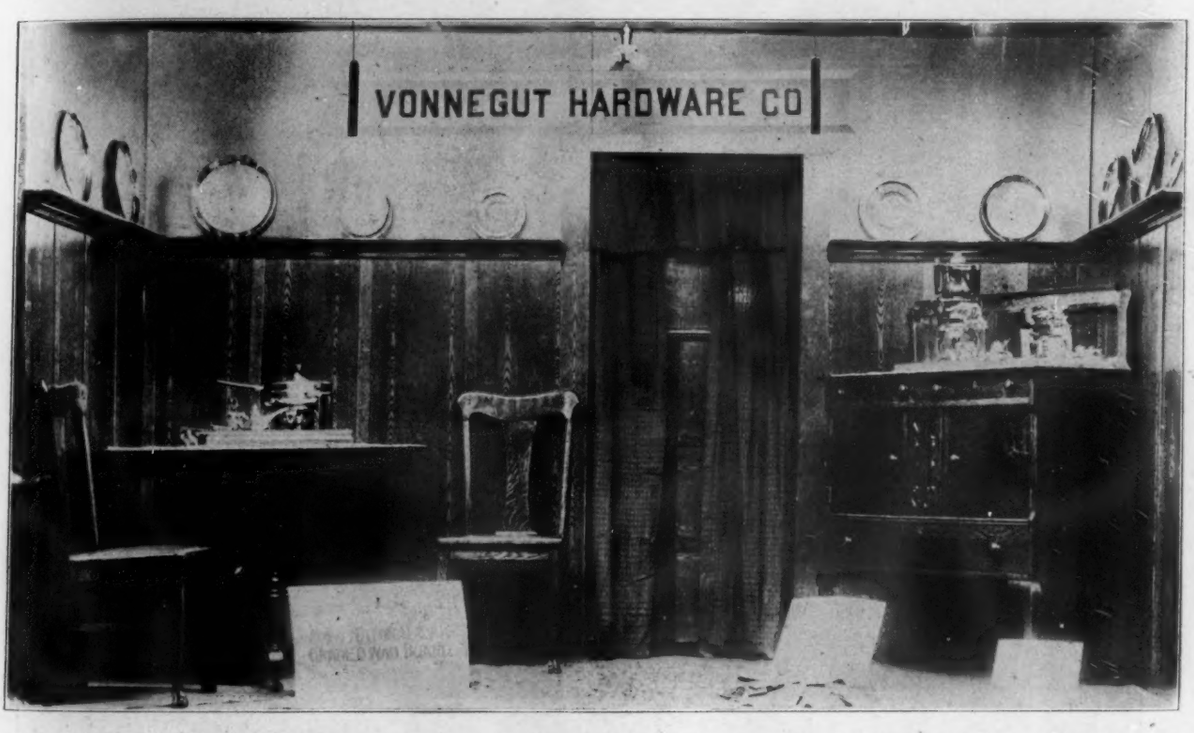
OLD HARDWARE STORE TO GO OUT OF EXISTENCE.

One of the oldest hardware establishments in the country will disappear when the wholesale hardware and saddlery business now conducted at 221 River Street, Troy, New York, by Charles F. Drake, is closed. The concern dates back to 1838, when it was founded by Francis Drake, who engaged in the manufacture of hardware saddlery. The founder was practically the pioneer in the business in this country, as at the time nearly all goods of that description were manufactured in England and imported. In 1872 the plant was removed to its present location. After the death of Francis Drake the business was conducted

by Winne, Burdick & Co., and subsequently by Winne & Drake. The latter is the present owner, and is a son of the founder. About twenty years ago the manufacturing department was abolished, and since that time the business has been confined exclusively to wholesale jobbing. The building is needed by the owners, William H. Hollister & Co., and Mr. Drake has decided to retire. The horse and harness goods have been purchased by William D. O'Brien.

AN EFFECTIVE WALL BOARD WINDOW DISPLAY.

In the following illustration is shown a window display made for the purpose of exploiting a certain kind of Wall Board. It was arranged by Orval D. Harrison for the Vonnegut Hardware Company, Indianapolis, Indiana, and received honorable mention in the recent Window Display Contest of the AMERICAN ARTISAN. The display represented the dining-room, ten feet by six feet by seven feet high.



Window Display Arranged by Orval D. Harrison for the Vonnegut Hardware Company of Indianapolis, Indiana, Which Received Honorable Mention in the Recent Window Display Contest of AMERICAN ARTISAN.

The side walls up to the frieze show the grained side of the board with the strips to break the joints, giving it a natural wood paneled effect. Above the frieze and the ceiling, the reverse side of the board was used, giving it an effect of ingrained paper.

A regular plate rail was used, upon which was placed nickel and brass trays, which were taken from stock. The ceiling was paneled and the center had a cluster of four frosted lights. The floor was covered with a Brussels rug, 4x6½ feet, around which was a border of green denim. On the table was a chafing dish set, and on the buffet a coffee machine set. These pieces were also taken from stock.

Owing to the length of the exposure the photographer had to take to get the grain effect of the board, the lettering on the signs do not show. The large sign to the left said "If you are thinking of decorating your dining room or other rooms, use B. & S. Natural Oak Wall Board."

The sign in the center, where the pile of samples is shown, contained the words, "Come inside and get a sample." The small sign to the right contained the name of the firm who loaned the furniture.

This was a most attractive display and many hundreds of samples were given away, and a considerable volume of business was recorded.

WILLIAM BINGHAM COMPANY OPENS BIG ADDITION TO STORE.

The William Bingham Company, wholesale and retail hardware dealers of Cleveland, Ohio, have recently increased their floor space by greatly enlarging their retail department headquarters. The jobbing departments will be in an ell, facing on West Ninth Street, this being a separate building, but connected with the retail store.

This company has been in their present location for seventy-one years. When the firm was founded by William Bingham in 1841 Cleveland had a population of 7,000. Originally the store had a frontage of twenty feet. Today the entire front floor of the Perry-Payne building is used, 120 feet frontage on Superior Ave. N. W.

The storerooms have been remodeled and modernized. The main store and the two warehouses contain six acres of floor space. The improvements just finished are characteristic of the development in business. All rooms are large, with beamed ceilings. There are plate glass and prism reflectors that carry light into the darkest corners. The walls are finished in white. Harmony is apparent in the scheme of finishing.

The hardware department on the first floor is luxurious. Fronting on Superior Ave. N. W., the room

reminds one of the interior of the private room of the board of directors of some gigantic corporation. The smaller articles of builders' hardware are kept in cabinets that stand at one side of the room. Pushing back the sliding doors of the cabinets, the salesman shows to the prospective customer the bronze or silver furnishings in the correct styles of the Adams period, Louis XIV or the Colonial.

WINDOW DISPLAY OF O. V. B. CUTLERY.

The following very attractive Window Display of cutlery was arranged by a window-trimmer from Hibbard, Spencer, Bartlett & Company, for P. Dalenberg, a hardware dealer at 110th and Michigan Avenue, Chicago. The former company is one of the few now in existence who make it a practice of co-operating with hardware dealers by helping them trim their windows.

Window Display Arranged for P. Dalenberg, 110th and Michigan Avenue, Chicago, by a Window-Dresser of Hibbard, Spencer, Bartlett & Company, Chicago.

It will be noticed that the principal features in decoration in this window are the display boards which furnish a background for the knives, razors, carving-sets, scissors and shears, and other forms of cutlery. These backgrounds are all in the form of a shield, which is the trademark for O. V. B. material and show off the articles to the best advantage.

It is rather unfortunate that the light was so poor, since the photographer has managed to take in a great deal of the building across the street, but notwithstanding this the beauty of the display and its absolute simplicity may be thoroughly appreciated by all who understand the elements of window-trimming.

The post in the center of the window has been very effectively draped with cloth of two different designs and the floors and stands have also been covered with dark cloth. Streamers and pennants are hung from the top of the window, and the floor is covered with various kinds of cutlery, very neatly arranged. The window is not overcrowded, everything exhibited being in plain sight of the passerby, and it is reported that a great deal of business in O. V. B. cutlery was recorded during the time the Window Display was on view.

THE LATEST IDEAS IN WASHING MACHINES.

Under the above title a booklet has been issued by the Twentieth Century Manufacturing Company, of Mansfield, Ohio, which has proved quite an innovation. Instead of following the ordinary methods of manufacturers when bringing out catalogues, this concern has introduced quite a few novelties. A lengthy introduction is given for the benefit of readers who are not thoroughly familiar with washing machines in general, and some excellent points are given on how to investigate and judge various types of washing machines.

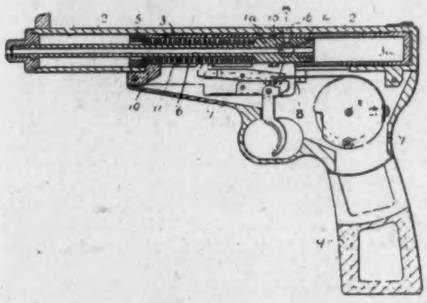
Those who imagine that this is a limited subject will be very much surprised to learn all the details which must be considered. The description is followed by an account of how the Twentieth Century Washing Machines made by the Twentieth Century Manufacturing Company are constructed. This is illustrated by halftones, which show the various types and styles of washers manufactured by this company.

There are washing machines for all kinds of power —gasolene, electric, hydraulic, and hand—and consequently an excellent line is offered to dealers in any locality. Everyone should hasten to obtain one of these booklets, for it contains a great deal of very valuable information. The Twentieth Century Manufacturing Company will be glad to send it upon request to any address, together with additional information. Write for this, and when writing please mention AMERICAN ARTISAN.

NEW AIR PISTOL OR GUN.

George Norman, Birmingham, England, has been granted United States Patent No. 1,043,534, and is the assignor of the same to The Birmingham Small Arms Company, Limited, Birmingham, England.

The patent is on an air pistol or gun having the breech end of the barrel mounted within a fixed outer



Recently Invented Air Pistol.

cylinder or casing with an interposed hollow piston or plunger, which slidably embraces the barrel. This is adapted to form an air chamber at the breech end of it, the sliding piston being moved in a forward direction over the breech end of the barrel by the piston spring and in a rearward direction by the cocking mechanism.

ANNUAL MEETING OF IOWA HARDWARE MUTUAL INSURANCE DIRECTORS.

The annual November meeting of the Board of Directors of the Iowa Hardware Mutual Insurance Association convened at their offices in the Hardware building at Mason City, Iowa, on November 14, 1912, the purpose of this meeting being to review the year's work and to estimate and declare the policy holders' dividend on policies expiring in the year 1913. From the various reports presented by Secretary A. R. Sale to the board to enable them to review the work of the year and make the estimate some interesting data was gathered.

The dividend for 1913 was declared at 50 per cent of the premium paid by the policy holder, this being the fourth consecutive year that this liberal dividend has been paid by the Iowa Hardware Mutual.

In addition to the work of estimating the saving for the policy holders of the association, arrangements were made for the annual policy holders meeting which is to be held in Des Moines, Iowa, on the 26th day of February, 1913, in connection with the annual convention of the Iowa Retail Hardware Association.

There were present at this session of the Board of Directors: President L. C. Abbott, Marshalltown; Mr. H. F. Leibsle, Des Moines; Mr. Th. N. Petersen, Council Bluffs; Mr. L. Lindenberg, Dubuque; Mr. R. J. Breckenridge, Brooklyn; Mr. Geo. A. Bieber, Fort Atkinson; Mr. C. R. Keating, Mt. Ayr; Mr. Joseph Mattes, Odebolt, and the secretary, Mr. A. R. Sale, Mason City.

The Iowa Hardware Mutual Insurance Association is making a fine record for its policy holders and is making a splendid bid to the serious consideration and approval of all hardware association members.

PLANS FOR HELPING DEALERS PRODUCE RESULTS.

One of the advertisements forming a part of an extensive campaign now being conducted by the Richards-Wilcox Manufacturing Company of Aurora, Illinois, is shown below. This is directed to the consumer through farm and building papers and is designed to be of great help in producing business for the retail hardware dealer. It is said to be creating a nation-wide demand for the improved door hangers, as well as other hardware specialties put out by the Richards-Wilcox Manufacturing Company.

In addition to the publicity campaign the Richards-Wilcox Manufacturing Company have recently organized a service department for the purpose of formulating result-producing selling stunts for the dealer.

Besides creating a demand for Richards-Wilcox products, this department, headed by Ralph Barnum,

makes a study of the retailer's store problems and assists him in selling more goods in other lines. This highly commendable co-operative plan is deserving of the favorable comment it is creating, for it is said to be pulling profitable business into the stores of thousands of dealers all over the country. Write for full details of the plan, and, when writing, please mention AMERICAN ARTISAN.

BEST HARDWARE PAPER PUBLISHED.

To AMERICAN ARTISAN:

F. R. Smith & Co. of this place have been out of the hardware business for several months, but we must say that we think AMERICAN ARTISAN is the best hardware paper published in America. F. R. SMITH.

Pender, Nebraska, Nov. 14, 1912.

BIG RETAIL STORES FIGURE PROFIT ON DELIVERED COST.

BY FRANK E. GOODWIN.

(From The American Paint and Oil Dealer.)

One of the stock arguments used by those opposing the plan of figuring selling price on the delivered cost is that "everybody figures expense on the gross sales" and therefore must compute the selling price downward instead of building it up, as I have advocated. In fact, one concern building cash registers as a business and advising retailers on the side, has gone so far as to declare that to determine selling prices by the method I have advocated, is "destructive."

Both of these allegations I deny. And in the words of the Southern jurist, I "defy the allegator" to the proof.

Many of the most successful merchants make their selling prices by using the delivered cost as the basis, and I think all merchants should do so. In *System* for July, is this statement by Mr. J. M. Abbott:

FROM J. M. ABBOTT, IN SYSTEM.

"An eastern department store fixes its selling prices on a particularly systematic plan. (1) *The net invoice cost* of each item is first burdened with a fixed percentage to cover (2) *store expenses,* carefully calculated from the results of the previous year's business. (3) Then seven per cent is added as an arbitrary *profit.*

"The total is considered the cost of the goods so far as the store is concerned, and they are charged to the different departments at this rate. This actual cost is disregarded the moment the goods are received. Beyond this the price fixing is left to the department heads, but as this store turns it stock over on an average eight times a year, it is assured at the outset a return of fifty-six per cent annually on its investment.

"If, for example, a lot of women's skirts are received on July 1st invoiced at forty-five dollars a dozen and subject to a cash discount of three per cent, the actual cost would be forty-three dollars and sixty-five cents. To this is added, say, twenty-two per cent for store expense, bringing the cost to fifty-three dollars and twenty-five cents. Then comes a profit of seven per cent, and the skirts are charged against the department at a cost of fifty-six dollars and ninety-eight cents. They may be regular six-dollar quality, but to move them quickly the department head might decide on a very special sale, marking them at four dollars and ninety-nine cents. In addition to the office profit, the store will then have made an extra profit of five per cent, or a total of twelve per cent.

"But the special sale has turned these goods over quickly, perhaps at the rate of twelve times a year, so the store is making one hundred and forty-four per cent annual interest on *its investment in the goods.*"

The above is here printed verbatim as it appeared in System, but I have emphasized several words with italic type and inserted the figures 1, 2 and 3 in the parentheses in first paragraph—this to more graphically show that the department store uses exactly the method that I have advocated in the *American Paint and Oil Dealer,* viz., making the price the sum of the three items, Delivered Cost, plus the Profit *thereon,* plus the Selling Cost.

Mr. Abbott's last paragraph is enlightening also as showing the reasonableness and propriety of considering only the Delivered Cost of *the goods* as the investment, upon which, alone, all profit should be figured, to pay a certain per cent upon that investment.

OTHER PROMINENT EXAMPLES.

I recently wrote letters to twelve big retail stores, in as many cities, selecting those known to be the most successful and profitable ones. I asked them to inform me as to their methods of keeping expense accounts and making retail prices, on the promise that their names would not be published without first having obtained their permission, if this Cost Accounting controversy would come to a "show-down."

Eleven of these twelve big department stores answered the question I had prepared.

The first of these questions was: "Do you figure your selling expense upon the volume of sales, or upon the delivered cost of goods?"

Every answer was, in substance or effect, that they computed the expense of selling upon the wholesale cost of merchandise, with freight charges added.

The second question was: "In making selling prices do you add the selling cost to the delivered cost of goods, and then add your net profit; or do you compute the expense and net profit on the selling price?"

Again each of these eleven great retail business houses answered that they added their selling cost and profit to the cost laid down on the floor. Not one made its selling prices in accordance with the instructions of the "experts" who declare that my method is "destructive."

As each one of these eleven stores is the leader in its selling territory, and each is rated high by the commercial agencies, it would seem that they had every reason and opportunity to determine whether their methods, and my method, is "destructive," or accurate, scientific and practicable. The fact that every one of these big retailers who answered, agreed that their best interests are conserved by doing just what I have been advocating in the *American Paint and Oil Dealer* ought to put to rest any feeling that I must be wrong because the manufacturers of accounting machinery, backed by big capital, and represented by clever publicity men, say that their plan is the right one.

The head accountant in one of the stores written to (it is in Chicago and has been in business many, many years) seemed to take unusual interest in my questions, and he dictated a long and interesting personal letter, going deeper into the matter than I had asked. He wrote that it would be impracticable, if not impossible, for his concern to compute the cost of selling goods on the volume of sales, for the very simple reason that wholesale prices fluctuated considerably during the twelve months, thus confirming my statement in these pages that costs and profits figured on the sales encouraged the blind eagerness to make sales, regardless of actual profits.

In this connection, this accountant said that each lot of goods in regular stock must show a certain amount of net profit over and above the delivered cost and expense of selling. By this, he said, he did not mean that no goods were sold without profit, for as a line dwindled down to tail-ends and shop-worn articles, what remained were moved at a price which, on the single article, would show a loss. But the whole dozen, hundred or gross, must show an arbitrary net profit, or the manager in charge of the department would be taught a lesson which he would not soon forget.

This head accountant further stated that in price making the first price naturally carried a considerable amount of net profit; sufficient to allow of mark-downs, bargain sales, etc. But, he added, there is a dead-line below which no department manager dares to go, without authority from the head accountant himself, who himself must first confer with the general manager for any permission to close out goods at a price which would not allow the whole original lot to show the required amount of profit. This, he declared, would be impracticable if prices were not built up from the cost laid down.

Every department manager, this accountant said, knows the delivered cost in every line, and of every article over which he has supervision; and each manager is informed what it costs to sell the goods, and what net profit is expected. It was an easy matter for him to make his figures, when called upon to furnish his share of the bargain-day offerings. And he is held strictly to account for the correctness of his figures.

What it costs these eleven big department stores to do business I did not ask. I felt that it was none of my business, and that the information would be refused. But in giving me concrete examples of how selling expense and net profits were figured by them, two of these accountants gave me such information as to lead me to believe that they add not less than 8 cents profit and 25 cents selling expense to every dollar of delivered cost.

RETAIL HARDWARE DOINGS.

NEW RETAIL HARDWARE STORES.

Wellington, Kansas—Albert A. Fisk, formerly in charge of the Farmers' Hardware store at Alva, Oklahoma, has opened a hardware store here.

Charleston, South Carolina—A. George McDermid, formerly of the firm of Strohecker & McDermid, has gone into business for himself and has opened a hardware store at No. 130 East Bay street, of this city.

Hordville, Nebraska—Oscar Branting, general merchant of this town, has added a complete line of hardware to his stock.

Madison, Nebraska—W. F. Stringfellow has purchased a hardware and implement business at this place.

Casey, Iowa—Chas. S. Galiher of Stuart has purchased the J. C. Cuning Hardware store.

Marshalltown, Iowa—Geo. Bourne has bought an interest in a hardware store at this place.

Mason City, Iowa—The Clover Leaf Company has now opened a hardware store in the Knights of Columbus Building, of this city.

Fosston, Minnesota—Randkley & Company, hardware, have opened for business.

Houston, Missouri—L. Daniel Elliott will soon engage in the hardware business, under the style of the Elliott Implement & Vehicle Company.

Iowa City, Iowa—Smith & Paden's new hardware store was opened for business last week.

BUSINESS CHANGES.

Prescott, Iowa—The Peters Hardware store, of this city, has been sold to Messrs. Bohanan & Johnson.

Clear Lake, South Dakota—Carl Anderson, of the firm of Olson Bros. and Anderson, has sold his interest in the hardware store to Lyman Richardson.

Peterson, Iowa—Peter Henrickson and Oscar Namur have purchased the Goodman Bros. Hardware store, of this city.

Wexford, Iowa—Blackhurst & Connine have sold their hardware stock to Sprague Pratt & Wm. J. Rennie, both of Traverse City. Business will be continued under the name of Wexford Hardware Company.

Rock Creek, Ohio—F. W. Leggett has sold his hardware and grocery store to W. W. Grove of Ashtabula.

Canton, Ohio—Fisher & Haynes have disposed of the J. L. Smith stock of hardware, in this city, to Sam Whitenack.

Hallettsville, Texas—Mistrot Bros. & Co. here have sold the business to J. W. Ward, who will continue it at the same stand.

Wallis, Texas—W. L. Thomas, formerly manager of the Grant Lumber Company of Hallettsville, will engage in the hardware business here.

Lake City, Florida—John Jenkins has recently purchased the hardware business of C. H. Raulerson, and has moved the business to North Marion Street in the Quincess block.

Portersville, California—A transfer has been completed of the Ostrander hardware store in Lindsay to the Thomas Hardware Company of this city. Pearl Stone will have charge.

Hornick, Iowa—Pritchard & Son's hardware store was recently burned. The loss was reported to be $7,000.

Marengo, Iowa—J. M. Dean has sold his hardware business to W. F. Lamprecht.

Germania, Iowa—The hardware stock and building recently owned by J. E. Hankins was bought by J. N. Welfare.

Casey, Iowa—Charles S. Galiher of Stuart recently bought the hardware business of J. C. Cunningham, of this place.

Delta, Iowa—J. E. Hankins recently bought the stock and building of the Hamilton Hardware & Implement Company.

Mt. Ayr, Iowa—The Redding Lumber Company recently purchased of Scott Bros. the hardware store at this place.

Maroa, Illinois—Caplinger & Miller sold their hardware stock to Ben Mills.

Altamont, Kansas—L. C. Libby has sold his hardware interests to Mr. Bonebrake.

Formosa, Kansas—Willis Bros. of St. Joseph recently bought the hardware business of J. W. Buck, of this place.

Alta Vista, Kansas—G. W. Beitzel has disposed of his hardware and implement store to G. Wirtman, of Washington, Kansas.

Manhattan, Kansas—Robert Spilman has sold his interest in the W. M. Stingley & Son hardware store to Frank Stingley.

Council Grove, Kansas—R. G. Durland and C. H. White have purchased the interest of A. Puryear, in the Durland-Puryear Hardware Company.

Ashburnham, Massachusetts—Joel P. Marble has sold his hardware and grocery business, Carey & Shea purchasing the hardware stock and the building.

Walters, Minnesota—John Hoverson has bought out Wm. Meyer, hardware business.

St. Cloud, Minnesota—Raw & Boddy recently purchased the hardware business previously owned by O. P. Boutwell, and will continue at the old stand.

Memphis, Missouri—Lloyd Summers has purchased the store of the Milton Hardware Company, at Milton.

Spiritwood, North Dakota—Anton Freid, of Wimbledon, has bought out Rounseville & Doty, implements.

Catskill, New York—Herbert J. Butler will leave the Day & Holt Company and will remove to Albany, where he has accepted a position with the Albany Hardware Company.

Viola, Wisconsin—O. Laccon sold his hardware stock to Julius Sime.

Rice Lake, Wisconsin—E. B. McCollun has bought P. M. Parker's interest in the Parker-West Hardware Company.

Marion, Michigan—Walsh & Company, hardware dealers, have sold out their business here to Turner Bros. & Steuble.

Edinburg, Illinois—Herbert Etter has sold his business at Hettick, Illinois, and is opening a new store at Kincaid, Illinois.

Franklin, Nebraska—A. W. Lynch and his son and daughter have purchased the half interest in the hardware store of Lynch & Burton from Chas. Burton.

Virginia, Nebraska—Walter McGaffey is authority for the information that Wililam Holm has disposed of his hardware and grocery store to Mr. Christie of Lincoln.

Sharpsburg, Iowa—Clyde Miller traded his hardware line to J. E. Powell for his farm east of Bedford.

Washington Springs, South Dakota—E. V. Shaw has purchased the Hinners Hardware store.

New Bethelehem, Pennsylvania—S. K. Smith & Son have moved their hardware store from its former location to the room formerly occupied by the McEwen Hardware Company, Wood Street.

Madill, Oklahoma—Harry Parker has sold his stock of harness, saddles and vehicles to Vittitoe-Rabon-Ross Hardware Company. Stock was moved to the latter's place of business on west side of the square.

Quincy, Illinois—The Lageman Hardware store at Ninth and State, owned lately by J. M. Welch, has just been sold by him to M. M. York of St. Louis.

MISCELLANEOUS.

Lancaster, Pennsylvania—A delivery motor truck of the Steinman Hardware Company was struck by a shifting engine of the P. R. R. on November 7th. The driver was pinned in the machine by the steering wheel, which was completely broken, and received a fright—but escaped injury.

Fort Wayne, Indiana—The Seavy Hardware Company has brought suit against John Hageman for breach of contract, demanding damages in the sum of $500, alleging that the contractor agreed to purchase glass and other hardware to be used in the new addition to St. Joseph's hospital, but failed to do so.

Wheatland, Oklahoma—W. H. Howard, a hardware merchant of this place, was committed to federal jail for ten days, at Oklahoma City, for contempt of court by disregarding a summons in an involuntary bankruptcy case.

Hebron, Indiana—A fire in the Dilly building, of this place, occupied by Smith Bros., dealers in hardware, caused $80,000 loss, affecting several others also.

Greensfork, Indiana.—The hardware stock owned by Willia H. Roller was completely destroyed by fire. His loss was $5,000 on the stock and building and his insurance was $3,600.

Portsmouth, Ohio—Workmen engaged in excavating for the Hibbs Hardware Company's new home on Sixth Street, experienced much trouble Tuesday morning, on account of broken cable, used to drag the plow.

Vincennes, Indiana—W. H. Weed will re-enter the hardware business, after having been out, on account of ill health, since 1907.

Atchison, Kansas—The Berry Hardware Co.'s store was damaged by fire.

Cleopatra, Missouri—William Bruner's hardware store was destroyed by fire. The loss was reported to be $700; insurance, $600.

Monrovia, California—B. S. Davies, a hardware merchant, who recently underwent an operation in Los Angeles, is making an excellent recovery and will soon be well enough to return to his home.

Belle Vernon, Pennsylvania—Notice is hereby given that the partnership between Chauncey S. Duvall and John Vance, doing business as the Vance Hardware Company, of this place, was dissolved by mutual consent on November 7th, 1912.

Bryan, Texas.—Myers Hardware Store caught fire on November 15th, but was extinguished before any material damage was done.

Mayville, Michigan—Will Ohmer has accepted his old position with the Marlette Hardware Company.

Trenton, Missouri—The window of the Trenton Hardware store has been attracting a great deal of attention. The display consists of a mammoth Keen-Kutter knife, which opens and shuts automatically, the huge blades being kept in motion by an electric motor.

Advertising Department

Our readers are invited to send in copies of their advertisments in the local press for criticism. All Communications should be addressed to the "Advertising Department" of AMERICAN ARTISAN.

THE PUBLISHER TAKES PLEASURE IN MAKING THE ANNOUNCEMENT THAT AMERICAN ARTISAN AND HARDWARE RECORD WILL BE SENT FREE OF CHARGE FOR THE REMAINDER OF 1912 TO NEW SUBSCRIBERS FOR THE YEAR 1913. YEARLY SUBSCRIPTIONS RECEIVED NOW WILL BE CREDITED TO THE END OF THE YEAR 1913.

The following ad of the Fraser Hardware Company of Vancouver, British Columbia, appeared in *The*

Rent or Buy a
GUN
FRASER HARDWARE Co
For the week-end shooting.
Best standard Guns and Ammunition.
An especially fine line of Huntsmen's Togs. All Hunting Accessories.
FRASER HARDWARE Co
THE HOUSE FOR SPORTING GOODS
651 GRANVILLE ST
PHONE SEY. 4013

Daily Province of Vancouver for September 19, 1912. The name of the concern is most advertised here, appearing alongside of the gun and also at the bottom, thus taking up over one-third of the entire space. Of course, there is a stock cut at the bottom, and this can hardly be avoided, but if the advertisers will emphasize merits and good features of the guns they are exploiting, readers will look to the end to find out the name of the hardware store where they can be obtained. The display head is good, but it would be better to put the rule after the phrase, "For the week end's shooting," and hunters' togs and accessories should be emphasized in bolder type. The ad as arranged should bring considerable business, but with these few changes could be made much more effective.

* * *

The following ad of F. W. Coons, Troy, New York, appeared in *The Troy Record*, of Troy, for September 28, 1912. The copy itself is very good, but the space is too small to wisely allow the dealer's name to take

WE SELL THE
VERY BEST Iron Fence
on earth for Lawn or Farm and at prices that will not flatten your pocketbook. Enough said. Send to us for catalog and descriptive matter to-day.
Estimates cheerfully given.
F. W. COONS, Troy, N. Y.
427 RIVER STREET,
(2d door from Jacob.)
Both phones.

up half of the room. If the advertiser's name were condensed to a smaller size there would be ample room for additional display lines. For instance, the fact that this dealer sells "The very best Iron Fence" will not interest anybody but those who are specifically looking for iron fence. On the other hand a line about the cheapness of the fence may appeal to some individual who at present is thinking nothing whatsoever about the subject. Judicious lining could be done between various sentences in this ad to good advantage.

* * *

The following ad of The Krause & Brothers Store, Lebanon, Pennsylvania, appeared in *The Lebanon Daily Times* for September 28, 1912. There are two points which stand out most prominently. One is that the name of the store takes up nearly half the available space, which is in itself very small, and second that the line "Stoves" is duplicated without any apparent advantage being gained. One of these lines could be dispensed with very easily and in its place an attractive display head should be used. If the

name of the store were only condensed into a little smaller space there would be room to add a little to the copy, giving the reader additional information about the stoves.

The business that can live without advertising is just the business that can best profit by advertising.

Heating and Ventilating

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THE WARMING OF COLD HOUSES.

In these days of scientific enlightenment as to hygienic conditions, it is somewhat amazing that so many people who are accustomed to take their exercises in the open air are yet content to live in ill-ventilated and poorly heated rooms, says a writer in *The Daily Mail* of London. Indeed, in many houses where architects have provided adequate means of ventilation these are frequently neglected and their labors brought to nought.

To some extent this may be excusable, because small rooms are often somewhat difficult to heat and ventilate without causing a draught. This is attributable in no small degree to the ordinary open coal fires. They do look cheery and comfortable, but that they are wasteful and extravagant is beyond dispute.

Without entering into technicalities, it is clear that whatever system of heating is adopted, adequate means of maintaining the purity of the air should be an essential factor; in other words, the air of every compartment must be changed frequently.

Closed stoves and the hot-water and hot-air systems, gas and electric radiators are among the most up-to-date means of economically and efficiently heating buildings.

Closed stoves are usually self-contained and free standing, having a smoke flue communicating with the open air. They are economical and do not require much attention, and have the advantage of radiating heat all round, but are apt to give off quantities of carbonic oxide if heated to a high temperature, unless the iron is completely protected by fire clay from direct contact with the fire. Another disadvantage is the absence of complete ventilation, as but little air in the room can ascend the chimney, which is often the only exit for fou lair in the room.

There are two methods of heating by means of hot water—viz., the low and high-pressure systems—in both of which water is heated in a boiler and conveyed to radiators situated in suitable positions.

The low-pressure system has many advantages, for, in connection with it, there is very little risk of accident by fire, and an even temperature is more easily maintained.

Coils and radiators are employed for the purpose of obtaining a larger amount of heating surface.

When very high temperatures are required, the high-pressure system is used, but sometimes a disagreeable smell is noticeable, which is attributable to the carbonic oxide given off by the iron pipes when subjected to such intense heat.

Heating by hot air may be effected in two ways. First, by passing fresh air through a furnace and leading it to various parts of the building. Secondly, by passing fresh air over a coil of hot-water pipes and using the warmed air for inlet ventilation. The latter is the method usually adopted, and is very effective, provided always that it can be so introduced as to obviate the raising of dust or the causing of a draught.

Gas is now used to some extent for grates, especially in bed and other rooms which are not used continuously. If, however, the products of combustion are not carried off by a flue they are unhealthy. Gas steam radiators are fitted with a special circulating boiler with flow and return pipes, and, as they only require to be connected to the gas supply, can be placed in any position. They cannot be recommended for use in ordinary rooms, however, unless means are provided for carrying off the products of combustion.

One of the most modern methods of heating is by electricity, effected by electric radiators connected to the wall plug of an electric current. This form of heating is specially applicable to town houses, because the heat may be turned on at once, and it is a clean, wholesome way of providing warmth.

The idea that electricity is expensive is somewhat erroneous, as many of the leading supply companies will furnish electricity for heating and cooking at a cost not exceeding one penny per unit.

It is somewhat difficult to dissociate the question of heating a room from that of ventilating it. We are in the habit of referring to a room as being "too hot," whereas we really mean it is badly ventilated, the excess of carbonic acid gas having rendered the air impure.

A Turkish bath, if properly ventilated, although raised to a much higher temperature than could be tolerated in an ordinary room, is of benefit to most people, so that pure heat alone has nothing to do with bad ventilation.

It is this question of providing pure heat to the quarters we inhabit during the day and sleep in at night that concerns very nearly the architect of today. In addition he must employ means of maintaining an equable temperature throughout his buildings, so that the inmates may not experience any discomfort in passing from one room to another. To effect this the system employed should be entirely under mechanical control, for only in that way may the whole building be uniformly and comfortably heated.

So much depends upon the size of the house and the depth of the owner's purse that it is difficult to lay down more than general rules as to the means to be employed in any case.

If one can afford a complete system of heating by hot water and radiators, it is generally advisable to install some such system, but many of us whose houses are tenanted upon short agreements are not in a position to install such expensive schemes. But there is one thing that nearly all of us are enabled to do, and that is to provide some means of heating our halls, passages and staircases, and it is a curious fact that in many houses one goes into, both large and small, one will find fires in nearly every room and yet the halls and passages are totally unprovided with any means of heating whatsoever.

If people would but learn that the fuel consumed in one or two of the rooms would be twice as economically employed in heating the *heart of the house*—viz., the halls and passages—a great step would be made in the direction of comfort and economy.

A hall and staircase which are improperly warmed are the usual cause of draughts and chills. The best way to prevent this is by means of hot-water coils, placed so that the incoming air from the front door and windows may be warmed, and so that the large amount of air in a hall and staircase may not be of lower temperature than the air of the rooms themselves. By so properly heating this portion of the house all the rooms abutting thereon are rendered more habitable, as the warmed air enters them through their doorways. The great secret of a properly warmed house lies in thoroughly attending to the hall and staircase, and no system will be found complete until this is taken in hand.

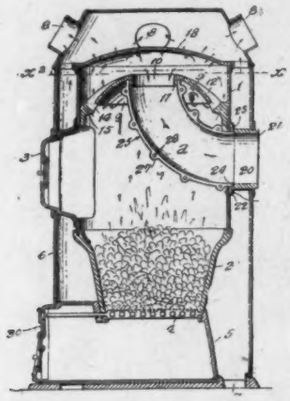
Where a hot-water scheme is too expensive, gas steam radiators may be bought or even hired from the gas companies for the heating of halls and passages. Slow combustion anthracite stoves may also be economically employed.

Where electricity can be obtained at a reasonable rate electric radiators may also be used for the purpose, or even well designed oil lamps are available for heating these much neglected portions of the house. Where cheapness and economy are essential, two or three small radiators may be heated by connecting a suitable boiler and pipes to a stove in the hall or some convenient room.

RECENTLY PATENTED HOT-AIR FURNACE

Below is an illustration of a hot-air furnace invented by Ansley A. Keays of Los Angeles, California, who has been granted United States Patent No. 1,043,941.

The patent covers a hot-air furnace consisting of



View of Hot-Air Furnace.

a drum having a door and a smoke outlet in its side, a fire-pot inside of the drum, a radiator mounted on the fire-pot and having a smoke-outlet in the side and provided with a top.

An inverted cup shaped baffle-plate of less diameter is mounted in the radiator and provided with a central opening, collars surrounding the smoke outlet and baffle-plate opening respectively. There is a smoke-flue connected to the collars and can be removed from the collars through the furnace door when the baffle-plate has been raised for that purpose.

PARAGRAPHS.

Lord & Taylor propose to install in their new ten-story building in New York City, which will be finished in 1914, a ventilating system which will change the entire cubical contents of air every fifteen minutes. A vacuum heating system, as well as a complete vacuum cleaning system, will be installed.

Mr. John Rude of the Carrington Plumbing & Heating Co., Carrington, North Dakota, has purchased a branch shop at New Rockford, North Dakota. He expects to sell stoves, furnaces, etc., and do all kinds of sheet metal work. Charles Ewalt, who will manage the business, desires catalogues and prices from manufacturers in these lines.

C. L. Wooldridge, Superintendent of Buildings for the Pittsburgh Board of Public Education, in his recent report severely criticised the school buildings of Pittsburgh, claiming, among other things, that 60 out of 140 buildings are improperly ventilated. He expects to take steps looking toward the improvement of all school structures in the city.

CONSIDERS AMERICAN ARTISAN A GOOD MAGAZINE.

To AMERICAN ARTISAN:

I read AMERICAN ARTISAN very thoroughly, and consider it a very good magazine for the line of business which it represents.

BERT T. ATTEBERRY.

Trinidad, Colorado.

OBITUARY.

Frank Edward Browne.

Frank Edward Browne, a well-known figure in the warm-air furnace field, died on November 4 at his residence in Los Angeles, California. His death occurred after a brief illness of a combination of pneumonia and neuralgia of the heart. Mr. Browne was a native of Connecticut, but had been a resident of Los Angeles for the past thirty-eight years.

He was the inventor of the Browne Furnace, and for a good many years was actively engaged in its manufacture. Two or three years ago he retired from active life, however, and was succeeded by the Phillips Heating Company. After his withdrawal from business he made an extended tour through Europe.

He was a keen sportsman, being interested most of all in hunting. He was an enthusiastic member of Westminster Gun Club of Los Angeles, and was also connected with several other clubs. He was prominent in the affairs of his home city for more than one-third of a century, was a heavy property holder there, and had hosts of friends, not only in the furnace trade, but in other lines of business throughout the entire country. He is survived by a widow. The funeral was held at his residence on November 5.

Tinshop

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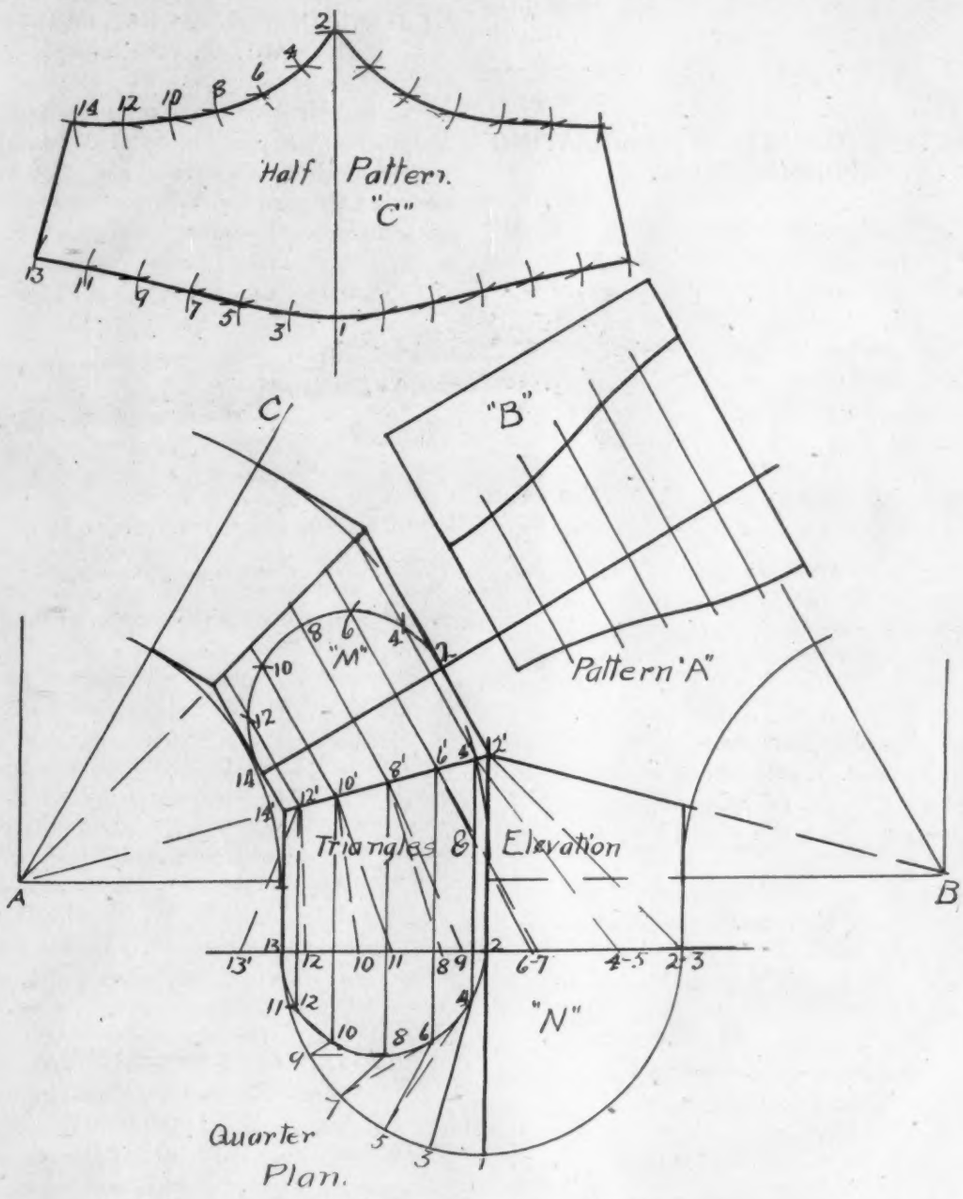
PATTERNS FOR A TRANSITIONAL BRANCHING ELBOW.

BY O. W. KOTHE.

The patterns wanted for this branching elbow by John V. Levan of Chicago in the November 2d issue, are herewith submitted. The main idea is to lay out the lower transition piece since the other elbow arcs are developed in the ordinary manner and so need little explanation, as they have been explained pretty well from time to time in these columns. However, it is well to know that an elbow part with a different miter cut will not fit on this transition piece when once developed unles certain sides are trimmed.

So first describe the half circle "N" equal to the diameter that the large pipe is to be; then from its center draw the vertical line both ways indefinitely, and construct the part elevation for the elbow with the miter lines in their proper position. Note that the miter lines A-2'-B are formed as the true miter line for any ordinary elbow.

Next describe the section "M" and divide in any number of equal spaces. From these points extend lines parallel with the outlines both ways to both miter lines as shown. From points 2'-4'-6'-8' etc., drop lines into "N." With your compases pick the length of lines in the section "M," thus establishing points 4-6-8-, etc. Through these points trace your curve and you have the plan view of the miter cut in elevation.



Patterns for a Transitional Branching Elbow.

Divide the quarter circle of "N" in the same number of equal spaces as there are in the plan view; draw lines from one point to another in the manner shown, and number your points. To obtain the true length of these lines pick each one separately with your com-

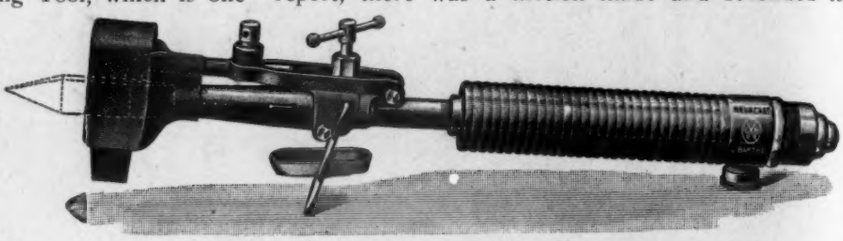
pass and place them on the horizontal line, using the vertical line as center as shown by 13′-12-10-11, etc., which are your true lengths to develop the pattern. For your pattern draw a line equal to 2-2′ as shown by the line 1-2 in the half pattern "C."

Set your compass equal to the first space along the miter line in pattern "A" and using point 2 in pattern as center strike arcs as at 4; next pick the space 1-3 from plan and using 1 in pattern as center, strike arc as at 3. Set the compass equal to 2′-3 and, using point 2 in pattern as center, cross arcs in point 3. Next pick the line 4′-4 from triangles and point 3 in pattern as center cross arcs in point 4.

Strike the arc 6 equal to space in pattern "A" and the arc 5 equal to the space 3-5 in plan; then cross these with lines 4′-5 and 6′-6 from triangles. In like manner continue with the rest of the pattern until points 13 and 14 are established; then trace lines through all points where arcs cross and the half pattern "C" is finished. To all patterns, laps must be allowed extra.

THE BARTHEL GASOLENE SELF-HEATING SOLDERING TOOL.

In the following illustration is shown a Barthel Gasolene Self-Heating Soldering Tool, which is one of the most popular of the large line of gasolene, alcohol and kerosene specialties made by the Globe Gas Light Company, 25 Union Street, Boston, Mass. It is designed for the use of tinsmiths who desire a combination of a firepot and a soldering iron in one compact tool, and as such it is said to be absolutely satisfactory and to give thoroughly good results wherever used.



View of a Barthel Gasolene Self-Heating Soldering Tool.

The reservoir contains gasolene enough to last for one and one-half hours if burned continuously, and it is asserted that it will never blow out. Either hatchet or pointed coppers are furnished, and these are interchangeable. Furthermore, it is pointed out that the removal of the soldering point from the tool leaves a complete torch which will burn in any position.

As a compact and handy soldering tool this has received some very high recommendations, and the manufacturers claim that a wide and ready demand exists for it so that it is a most valuable line for a dealer to handle. Complete information will be furnished together with circular describing the Barthel Gasolene Self-Heating Soldering Tool upon request. Write to the Globe Gas Light Company, 25 Union Street, Boston, Mass., for full details, and when writing, please mention AMERICAN ARTISAN.

TINNERS' STAKES DESCRIBED IN NEW P. S. & W. BULLETIN,

The Peck, Stow & Wilcox Company of 24 Murray Street, New York City, have just issued Bulletin No. 31, describing fifty different styles of Tinners' Stakes which bear the P., S. & W. brand. Every one of these Tinners' Stakes they have asserted to be of the latest and most approved pattern, having a wrought iron shank and a steel face. It is claimed they are built for hard and long service.

The different styles are completely described in the bulletin and illustrated by cuts. The Peck, Stow & Wilcox Company will be very glad to send this bulletin to anyone upon request.

The long line of bulletins which this company has issued make a valuable addition to any tinsmith or dealer's library, and everyone should avail themselves of the opportunity and secure the latest bulletin. Peck, Stow & Wilcox Company will also send a complete catalogue of their tinners' tools and machines upon request. Write for bulletin and catalogue, and, when writing, please mention AMERICAN ARTISAN.

MEETING OF MILWAUKEE MASTER SHEET METAL WORKERS.

The regular monthly meeting of the Master Sheet Metal Workers' Association of Milwaukee, Wisconsin, was called to order at half-past eight on the evening of November 6, 1912. Vice-President H. E. Bartelt presided. After listening to the Treasurer's report, there was a motion made and seconded to give the Secretary of the Builders' and Traders' Exchange another contribution to help defray the expenses incurred by him in connection with the Lien Law.

There were a number of communications read, including a letter from the National Secretary, Edwin L. Seabrook, of the Builders' Permanent Exchange, and others. Treasurer Hollitz submitted a Union Price List, which was adopted by the Sheet Metal Workers in 1872. This document was very interesting to all the members present.

The following members were in attendance or had representatives there: Wm. Hammann, Lavies & Co., Consolidated Sheet Metal Works, Hollitz & Bogenberger, J. J. Millen, Schumann & Roden, Klubertanz Bros., R. Jeske & Bro.

NEW TABLE SHOWING TOTAL SURFACE AREA OF SHEETS.

An interesting addition has been made by the Wheeling Corrugating Company of Wheeling, West Virginia, to their long list of tables for facilitating tinsmiths and dealers in the calculation of data. The latest table shows the number of square feet for covering surface per sheet, and also the total surface covering areas of any number of sheets from one up to one hundred inclusive of any formed roofings. There are separate tables corresponding to the roofings which

have been finished to the covering space of 23½, 24, 25, 25¼, 26 and 28 inches. Side laps have been allowed in the figures but no allowance has been made for end laps. The manufacturers also point out in issuing these tables that in figuring corrugated or beaded sheets no allowances of any kind have been made. The table should be of great help to every one in the sheet metal trade, and will be sent upon request to any address. Write to the Wheeling Corrugating Company, and when writing please mention AMERICAN ARTISAN.

A PATTERN FOR Y.

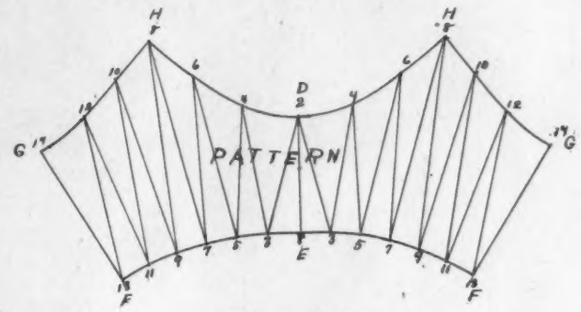
To AMERICAN ARTISAN:

In reply to the query of Filson Brothers of Point Pleasant, West Virginia, in the November 2 issue, here is given pattern for a "Y." To obtain pattern draw plan and elevation to scale desired. Let A B C D represent the main body of the Y.

Draw half section of same and space off as shown by Figs. 1, 2, 3, 4, etc. Next obtain the branches of the Y as shown by D E F C H and C J I G H, by drawing the center lines from H at the desired angle.

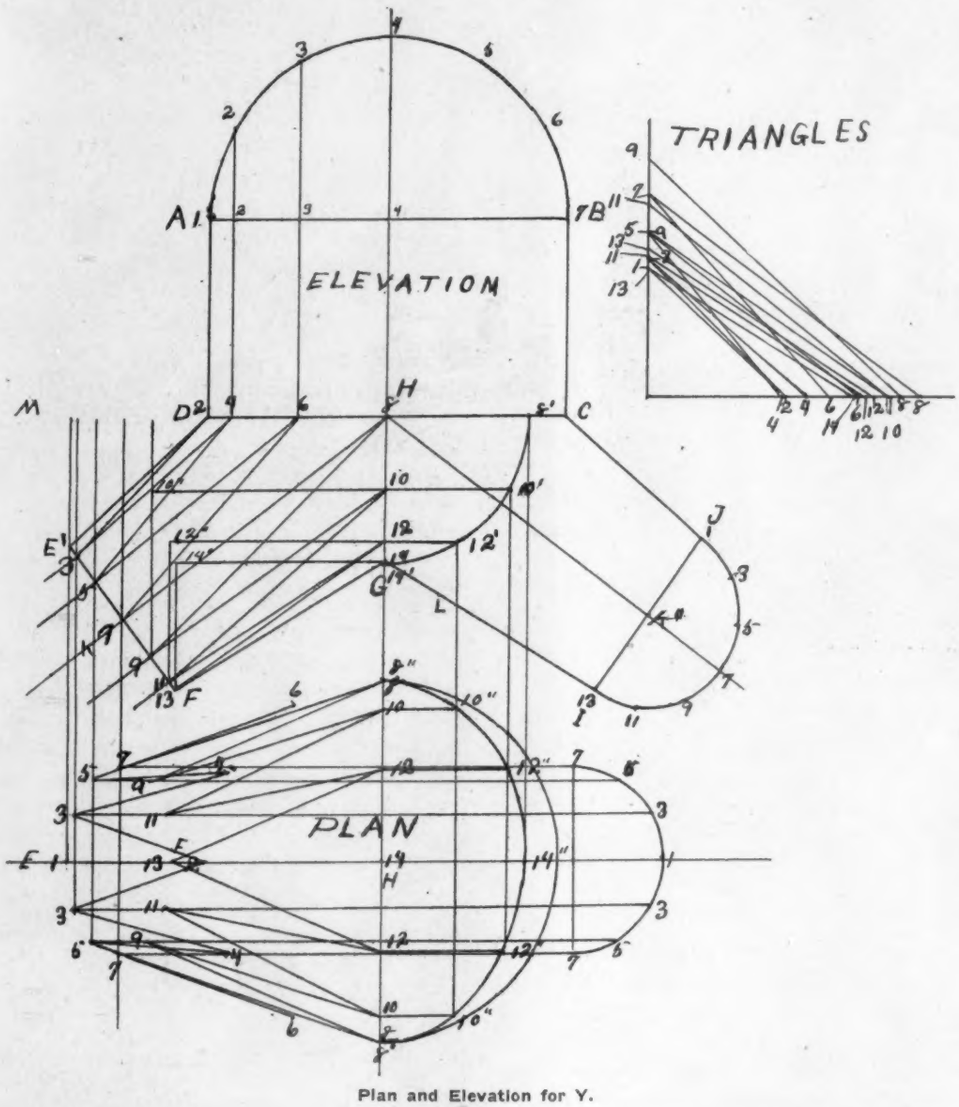
Mark the lines at K^1 K the length desired, and at right angles to H K^1 and H K^2 obtain E F and I J, which is the diameter of the ends of the Y.

Then draw lines from E to D and from C to J. Draw a line from C at right angles to H K^2 and obtain



Pattern for Y.

L, which will be the same distance from the center line as C. Construct a line from I through L to center line at G, and from G to F, which completes the elevation.



Plan and Elevation for Y.

Draw the half section E F and space off as shown by Figs. 1, 3, 5, 7, etc. Drop lines from the main section as shown by 2, 4, 6, 8. To obtain the points 8, 10, 12, 14, construct the profile as shown by 8′ 14′, by using H as center and 14′ as radius and obtain section H, 14, 8; space off and draw horizontal lines to center line as shown by 8, 10, 12, 14, and obtain the diagram as shown by the lines 1 to 2 to 3, etc.

Erect lines from the points on E F to the base M D 10″ 12″ 14′, which will be the heights in the triangles. Next construct the plan by using the point H as center and H D in elevation as radius, and obtain a plan of the main section D C, and space off as shown by 2, 4, 6, 8; next obtain the end E F by dropping lines from the points on the line E F in elevation and the points from the half section 1, 3, 5, 7, in plan. Space off the section E F in plan in accordance with the points E F in elevation.

To obtain the points 8, 10, 12, 14, in plan drop lines from the profile in the elevation, and, using the lines 2-2, 3-3 in the half section of the elevation, obtain the points 10″ 12″ in the plan. Then draw parallel lines to the center line as shown by 8, 10, 12, 14; then draw the diagram of lines as shown by 1 to 2 to 3, etc., which are the bases of the triangles.

Proceed with the pattern by using the line 1 to 2 in the triangles as 1 to 2 in pattern; then, with 2 as center and 2 to 3 of triangles as radius, describe the arc 2, 3, in pattern and with 1 to 3 of half section E F in plan space 1 to 3 in pattern. Proceed in this manner until the pattern is completed.

HOWARD A. LUTTS.

Elyria, Ohio.

COURSE IN SHEET METAL WORK FOR PHILADELPHIA APPRENTICES.

Since the organization of the Philadelphia Trades School in October, 1906, there have been classes in sheet metal work conducted in the evening. During the time since then, those in charge have been working to organize a course which would be efficient in affording to the young men who are apprentices at the trade during the day, an opportunity for instruction in the various branches of their work; the science, drafting and technique which they could not get as a result of their daily experience.

Before the opening of the present term, the school authorities and the Master Tin and Sheet Metal Workers' Association arranged for active co-operation, and as a result of this condition of affairs there are now enrolled in the class 137 young men who are regularly apprenticed at the trade during the day. The instructors in charge of the classes are men employed during the day time in sheet metal shops. A committee from the Master Sheet Metal Workers' Association visits the school regularly and gives to the school authorities the benefit of their experience.

The course as at present laid out is as follows:

FIRST YEAR.

A—Mathematics treating of the relations, properties and measurements of lines, angles, surfaces, and solids.
B—The size, weights and areas of commercial sheet-metal.
C—Areas of roofs. Capacities of vessels and tanks.
D—The use and care of drawing instruments, scale rule and protractor.
E—Perspective drawing of any object to be developed. This work continues throughout the year.

SECOND YEAR.

A—The principles of geometry relating to the development of surfaces.
B—The practical application of patterns developed and how to cut without waste from sheet metal.
C—Metallurgy relating to the use and nature of sheet metal composition of solders and fluxes.
D—The practical use and names of shop tools and machines as applied to manufacturing sheet metal goods.
E—Making practical working drawings. This work continues throughout the year.
F—The use of micrometer, caliper and trade terms for gauge, and weight of all sheet metals.
G—Tinsmithing and general development of simple patterns in pipe, cornice, skylight, heater and range, and general sheet-metal work.

THIRD YEAR—ADVANCED.

A—Practical projections.
B—Reading plans and elevations in relation to sheet metal work.
C—Practical pattern developments for pipe, cornice, heating and ventilating, hollow metal windows, and skylight work.
D—Developments of irregular surfaces by triangulation.
E—Metallurgy in relation to the metals and alloys used in the trade.
F—Review of mensuration pertaining to areas and capacities. Strength of materials, and tables of weights used in sheet metal work. Estimating, bookkeeping or simple accounts.
G—Raising and stamping sheet metal.

There will, no doubt, be changes in the course from time to time. It is hoped by Principal W. C. Ash and his assistants, after some experience, to be able to develop a course complete in detail, which will give the maximum return to the apprentices who are willing to sacrifice three evenings a week to instruction in their trade.

There are 1,000 men enrolled in Philadelphia Evening Trades School No. 1, in the various trades, but it is reported that in no one trade have the instructors been able to effect such co-operation, and, therefore, no such efficiency of class work as in the trade of sheet metal work.

SOME BEAUTIFUL AND ORNAMENTAL DESIGNS FOR STEEL CEILINGS.

A new catalog has just been issued by the Canton Art Metal Company of Canton, Ohio, illustrating a number of interior views showing the ornamental ceiling designs in different classes of buildings in which they are used, and the many beautiful effects which are produced. The two illustrations on this page show some of the beautiful designs which this company has already installed.

It is pointed out that the one objectionable feature in steel ceilings in the past has been in the mechanical construction, as a great many artistic designs have been spoiled by open joints, which in many cases had to be closed with putty.

The Canton Art Metal Co. state that they have always aimed to make construction first and above everything else in the manufacture of their ceilings and with this ambition in view they have now gone one step farther than any other manufacturer by repressing the beads on steel upper and lower dies, making them accurate to the one-thousandth of an inch and at the same operation punching the nail holes in the plates at the nailing points, which does away entirely with nailing through the metal at the different sections. This feature it is said is a saving of from 20 to 50 per cent in the cost of the erection and gives a perfect fitting ceiling when completed.

The catalog itself is of immense size, having a total of one hundred forty-four pages. It is printed on very

THE SAFETY OF GASOLENE SAD IRONS.

Considerable discussion has recently arisen in the trade relative to whether there is enough safety in gasolene sad irons, and in this connection the following letter, which was written by W. H. Roberts, president of the Ideal Sad Iron Manufacturing Company of Cleveland, Ohio, in reply to a query in one of the popular magazines, should prove very interesting:

Gentlemen:

We are in receipt of yours of the 8th, enclosing letter from Cassie B. Cutler, Fairmount, Tennessee, and take great pleasure in replying to the questions asked.

First, there is absolutely no danger in connection with the handling of the Ideal Gasolene Sad Iron, if the rules are followed; in fact, there is no danger in connection with the handling of this iron if the rules are not followed, with the exception that there would be danger of a little fire in filling the tank when the iron was burning. This is the only point of danger connected with the iron, under any and all circumstances.

The iron can be generated by using sufficient fluid to heat up the generator and tubing until they become red hot, which, of course, is unnecessary, and never done, yet it can be done without the slightest danger in connection with the gasolene that is in the tank, for the tank itself must become red hot before it will separate and permit the gasolene therein to catch fire and explode.

Should there be a small leak in the tank at any point when you are generating the iron, and this leak should become ignited, it will simply burn like a little torch until the fuel in the tank is exhausted, for, the pressure being outward, it cannot penetrate the inside of the tank any more than the lighting of a gas jet in your home would explode the main furnishing the gas jet with fuel, because the pressure is outward.

Next, the tank must become hot before the iron will give good satisfaction, and the hotter it gets the better the iron will work, because hot gasolene is more readily converted into a purer and better gas than is mediumly warm or cold gasolene. The tank, however, never becomes hot enough to affect it in the slightest degree, and while some people might say that the gasolene was boiling in the tank, they are entirely mistaken—it is just simply the fact that the iron is manufacturing a little more gas than it is consuming, and this is bubbling through the gasolene into the air space at the upper part of the tank, and sounds as though it was boiling.

The gasolene sad iron is much safer than an alcohol sad iron, for the simple reason that alcohol produces a gas many times more powerful than gasolene, and were you to enclose your tank and make it airtight, as we do the gasolene iron, you could not build a tank to hold it; the result would be that you would have an explosion every time, hence they always leave a vent in the top of the tank of an alcohol iron, and this vent permits the surplus gas to escape, reduces the pressure next to nothing, and causes the iron to burn like a slow chafing dish, and this is the reason why, up to the present time, no alcohol iron ever manufactured is efficient, because you cannot get heat enough to heat the iron to do the family ironing, and when you close this vent in the top of the tank you will explode your tank every time.

Further let us say, for the benefit of the writer of your letter, that there is no commercial manufacturing or transportation agency in the United States in which there is not at least four times as many people maimed and killed annually as are affected by gasolene, and yet gasolene is used in about ten million homes in the United States and Canada.

In conclusion let us say that there are tens upon tens of thousands of these gasolene sad irons in use every day. There are upward of eight million gasolene stoves in use every day, and we have never heard of an accident from the gasolene iron—that is, anyone being hurt—and very few indeed from these eight million gasolene stoves.

If the tank on a gasolene sad iron is filled after the blaze has been turned off or burned out, and the cap is placed on the tank before the iron is relighted, the possibility of an accident is not as great as lightning, for you know many people are killed by lightning in the United States every year, and not a single one by our gasolene self-heating sad iron.

If this is not satisfactory you may ask us any questions you please concerning the merits or safety of this tool.

Yours very truly,

THE IDEAL SAD IRON MFG. CO.

Cleveland, Ohio, November 11, 1912.

A BUSINESS WAGON FOR THE TRADE.

Every hardware and stove dealer finds it necessary to have a good delivery wagon. He wants a vehicle with an ample capacity for his stoves and wares, which at the same time must be light running, have a short turn and a low-built body. Below is an illustration of a wagon built by the De Kalb Wagon Company

A Low Down Short Turn Wagon.

(formerly the Sycamore Wagon Works) of De Kalb, Illinois. The company asserts that this wagon is of the highest standard and one that fulfills in every way the requirements of dealers. The De Kalb Wagon Company furthers adds that this is the most convenient delivery wagon built, because there is only a lift of 23 inches in loading and it has a short turn. Sockets are attached to the sides for holding side rails seat high. The body for this particular wagon is made in two sizes, with a gear from 1⅛ to 1½ inches.

The company points out that prospective buyers must not make the mistake of permitting the question of price alone to determine the purchase of a delivery wagon, for anyone can produce cheap goods to sell at cut prices, but it takes ability to build a better

wagon. It is claimed that the De Kalb Wagon Company has the best equipped plant in the West for producing business wagons. They guarantee and stand back of every job that leaves the factory.

Catalogue No. 41, which they have recently gotten out, illustrates nearly 3,000 different sizes and styles of the De Kalb line, ranging from a two-wheeled cart to a five-ton ice wagon. The De Kalb Wagon Company invites dealers to get in touch with them and make critical inspections and comparisons with anything on the market. Write for Catalogue No. 41, and, when writing, please mention AMERICAN ARTISAN.

A NON-CONDUCTING SAD IRON HANDLE.

Below is given an illustration of a sad iron handle manufactured by The Universal Stamping & Manufacturing Company of Cleveland, Ohio. This handle, it is said, will fit all the makes and varieties of Mrs. Potts' sad irons. The manufacturers point out that the feature of this handle is the locking device which takes a firm grip on the sad iron and fits tightly, so that it can neither rattle nor fall off.

View of Handle and Operating Lever.

The lever for attaching and detaching the handle is shown on the side. It can be operated while holding the handle and cannot get hot. The Universal Stamping & Manufacturing Company emphasize the value of this lever, made of indestructible material, and claim it to be very much superior to the little wooden knob of old-style handles.

Handle When Attached to Iron.

As can be seen from the illustration, there is no protruding metal to burn the knuckles of the hand after the handle has once been attached.

The wood handle has been cut out of straight-grain hardwood, which, the makers claim, is an advantage over the half circular or oval handles cut from cross-grained wood.

There are two forces involved in ironing, a downward force and a forward force. The weight of the iron takes care of the first force, leaving the second forward force to the person ironing. The manufacturers have departed from the straight horizontal handle by giving it an incline, and thereby, it is asserted, placing the hand and wrist in such a position that calls for less effort in sliding the iron forward or backward, and relieves the strain on the wrist of the operator.

The Universal Stamping & Manufacturing Company assert that more than a million of these handles are in use, a conclusive argument for good value and guarantee. The company have a catalogue and full information about this sad iron handle, and want dealers to get in touch with them. When writing to them, please mention AMERICAN ARTISAN.

UNIQUE CARDS FOR RED DEVIL TOOLS.

The Smith & Hemingway Company, 150-152 Chamber Street, New York, New York, have recently issued a series of large advertising cards, describing some of their Red Devil tools. These are suitable for hanging up in the office or store of any dealer and are very attractively gotten up. All of the cards have Red Devil glass cutters displayed on one side, but on the other side different tools are exploited. For instance, one card sets forth tools for electricians, including clamps, connectors and side-cutting plyers. Another card describes a complete array of plyers, shears and hack-saws, while still another illustrates the Red Devil Miter Box, giving an illustration of the box, and also some cuts and joints that can be made by it. The cards are printed in two colors—red and black. They will be sent to dealers upon request. Write for them, and, when writing, please mention AMERICAN ARTISAN.

HOW A HARDWARE DEALER MAY ADVERTISE PAINTS.

BY O. C. HARN.

(From an Address Before the Baltimore Advertising Club.)

For the benefit of dealers present who may be skeptical on the whole subject of advertising I ask first: Why should he advertise at all?

To answer this question with another, why should you have a ground-floor store? Why not be a "third-floor back?"

Why pay high rent for the store where you are when you could have the same floor space so much cheaper on a less prominent street?

I'll let the old darkey answer:

It was coming on Christmas time and the old negro prayed: "Oh, Lord, send dis po' ole niggah a turkey."

But no turkey came. The next day he prayed again: "Oh, Lord, please send dis po' ole niggah a turkey."

But no turkey came. Finally after repeated unanswered prayers of the kind, the old darkey in desperation, or new-found wisdom, changed his prayer and said:

"Oh, Lord, send dis po' ole niggah to a turkey!"

And, that night being dark, the po' ole niggah's prayer was answered.

So it is with the dealer. You should not be satisfied with the custom which comes by accident to your store. A certain number of people will pass it wherever it is located. You must *take* your store *to* the remainder.

You do this when you move from the obscure street to the prominent street where more people pass. But still you don't take it to as many as you might. Take it to those whose ordinary business does not call them past your store. How? By advertising!

What method shall we adopt? for there are many. It depends on conditions and your purpose. It is like the man in the barber's chair. Over his prostrate, helpless form the solicitous barber leaned and asked:

"How does it go?"

"What is the operation?" the victim replied. "If you are skinning me it goes fairly easy, but if you are shaving me it goes damned hard."

Your manner and method of advertising depends first on whether you are trying to reach the house-owner or the painter, each of whom has a different object in buying paint. Further than that, in the house-owner's family you may appeal either to the man or to the woman.

To the man, durability, the detail of superior spread of the paint which leads to economy, will appeal. The woman on the other hand, will be more easily attracted by considerations of appearance and the superficial side of economy, such as cheapness of first cost.

You will reach the painter best by showing him what he

can do the best work with. He is a manufacturer. He buys raw materials, white lead, linseed oil, colors, etc., puts labor upon them and turns out a painted building. He does not care for the paint materials for themselves. They are a means to an end. His interest is in a sense similar to yours as a dealer. The *selling* points are more important than the using points.

The selling points and using points frequently coincide but not always. Let me illustrate: Suppose that I take you up to Philadelphia or to any other one of our factories and show you how white lead is made. We start in at the very beginning with the testing of the pig lead to see if it is the required purity (copper, silver and even gold are impurities and must be thrown out). You see the lead cast into buckles or discs and stowed away in the stacks where they are corroded by acids into a white powder. This process requires from three to four months. You will see this corroded lead coming out from a stack and will follow it to rolls and screens and then to burr mills, where it is ground fine under water screened through the finest silk bolting cloth, dried, then mixed with linseed oil into the paste which you sell over your counter.

Now, you have seen the process and are satisfied that it is all pure lead, excellently well made and if you wanted to use some on your own house I might put some in a nail keg or tin pail and you would take it as willingly as if it were packed in our usual steel kegs.

But how about it if you wanted to sell that white lead again? Different story, isn't it? You don't want to stop and explain to a painter or a house-owner that, while the lead is in a nail keg or water-pail, it is absolutely pure because you saw it made. You want the advantage of our regular package with the brand on the head and the Dutch Boy on the side; because you know these things will make the customer accept the lead without any argument or waste of time.

Here is a case where, for you as a dealer, there is a *selling* point outside of and apart from the *using* point or intrinsic value.

Keep it in mind when you are advertising. The fact that an article is well advertised by the manufacturer is frequently a good reason for you to stock it and advertise it yourself. The work of selling it is already more than half done.

What shall be the mediums of our advertising story—through which we shall take our store to the people?

First, newspapers, by all means.

Second, various kinds of advertising by mail.

The newsboy and Uncle Sam can be of great assistance to you in taking your store to the people.

"But newspaper advertising is expensive," I imagine I hear some one say. That's a mistake. The highest priced newspaper space in Baltimore is $3.36 per inch. A post card contains about 19 square inches—that is, it is about equal to nine inches single column in the newspaper.

Such an advertisement in your most expensive newspaper would cost $30.24, and it would go to 80,000 people. What would it cost you to send the same advertisement on a post card? Eight hundred dollars for postage alone! And the printer would want another $80 at the very least.

Another paper will give your advertisement a circulation of 120,000 for $19.80. Uncle Sam will charge you $1,200 to reach that many homes. And don't forget the printer's bill.

Waste? Yes, certainly, but how much? Would half the newspaper's readers be worth your reaching? Would 25 per cent? Why, if only 5 per cent of the readers of one of these newspapers were first-class prospects for you, and 1 per cent of the other paper's readers probable buyers, you still would be reaching them cheaply through the newspaper, as compared with sending them a direct communication by mail.

There are undoubtedly some merchants who, on account of the limited neighborhood character of their business, cannot use their city newspaper. I do not envy them. They are badly handicapped and will never grow large.

Just a few words on your direct-by-mail advertising. Make your printed matter good, in what you say, how you say it and how you dress it. There is waste in this kind of advertising as well as in newspaper advertising. The waste-paper basket is always hungry, and few people starve it. Only the good stuff escapes it.

Before taking up the question of copy and other considerations let me drop a word parenthetically as to your attitude toward your advertising. Don't expect every advertisement you use to pay for itself in sales of the particular article you mention in that advertisement. No local advertiser expects that. Sometimes, by reason of special timeliness or special price, it may do so, but that isn't the usual thing. Advertise to *build* your business. Your paint advertising if done properly will help your other lines, if you have other lines, and vice versa.

Newspaper copy. First of all I should say let it be informing. So much advertising tells so little. It seems to follow the idea of the wit who defined language as "a means of concealing thought."

Next let your advertising be interesting. The two are not the same. It is possible to give information in a deadly, dull way. A subject which may have been once an interesting thing, no matter how stated, soon becomes uninteresting because it has lost its novelty. Time was when the mere announcement that a machine had been invented with which writing could be done very rapidly would have commanded general attention. Now the typewriter advertising man must exert his utmost ingenuity to gain a hearing.

So with the first automobile and the first flying machine. How soon the public tires! The paint is scarcely worn off the Wrights' first successful biplane, and yet it takes the cleverest kind of press-agency work and advertising to gather a crowd at an aviation meet.

Paint is an older story than any of these. Make your copy interesting. You *must* do it to succeed.

Shall the advertisement be short? I am reminded of that old, old story of Lincoln's legs. A wag sought to tease him about his long legs and asked: "Mr. President, how long really ought a man's legs be?"

"I have never given the question much thought," Lincoln drawled in reply, "but I should say, long enough to reach from his body to the ground."

"Printers' Ink" recently paraphrased this reply when it said an advertisement should be long enough to reach from the goods to the consumer.

I believe that is right. "Les Miserables" is very, very long; but no one who has read it has ever wished it shorter. I have seen people read a whole page advertisement in a newspaper, small print, too, and on the other hand I have seen them balk at the second sentence of a two-inch advertisement.

To try to limit an advertisement by an inch rule is foolish. Tell your story. Quit when you can no longer hold your reader. My theory is that a dull sentence allowed to slip in will do more damage than too great length. That dull sentence may cause a chasm which the reader will not leap.

Space need not be large and expensive. Put brains in a small space and you may often tell your story better than in a large space. But brains are more expensive to buy than large space, therefore many advertisements have large space in lieu of brains.

If you need *big* space, use it. If you don't, don't.

I know of a brilliant advertising solicitor who wrote a ten-page, closely written letter to prove to a prospective advertiser that any advertising story could be told in fifty words on a street-car card.

One of the most efficient paint advertisers I know of is the Cleveland Window Glass Company—or at least they used to be. They used small space, two or three inches in conspicuous position, but fillled it with crisp, suggestive copy.

They made themselves known to everyone in Cleveland. In selling glass they once advertised as follows:

"There are a million windows in Cleveland.

Somebody must 'tend to them."

Then followed an offer to send a man anywhere to put in a pane.

This advertisement was used in the street cars as well as in the newspapers and some joker erased the N in the word "windows," which gave the widows of the city some unintentional publicity.

No advertising in the New York papers today is more religiously read than that of Rogers Peet and Company. They use only a few inches but they put style and brains into it, and they reap their reward in an ever increasing business.

Let me say a word about the reading notice. Inexperienced advertisers often think that a mention in the reading column is much superior to a regular display advertisement. They will wheedle the editor into giving them "a free puff" if they can, and if they can't they will pay for it occasionally. It's a great mistake. There is greater power in the frank, signed advertisement. Several big public utilities corporations have just learned this lesson in the last few years. When they were relying on buying or intimidating newspaper publishers and getting favorable mention, the public remained hostile. In several notable cases in recent years these corporations have bought space and told their side of the story frankly over their own name with the most gratifying results.

I intended to say something about letters and mailing cards but time is slipping by and I must skip some points. I must stop long enough, however, to "hand one" to programs, special editions and other "scheme" methods which hang on the out-skirts of legitimate advertising and eat up the inexperienced advertiser's money in small driblets without giving him adequate return.

Programs are always costly on the basis of the price per thousand of circulation. They are not read and if offered to you on the basis of helping some cause you cannot afford the graft.

Special editions of newspapers generally cost more than the usual rate of the regular editions; they are so filled with

extra advertising that the efficiency of your advertisement is decreased; the increased reading matter discourages the reader, who thus gives less than his usual care to the reading of it; and, finally, if you are tempted to go into special editions when you are not a regular advertiser you are throwing your money away, because one-time advertisements never built a business.

Have a regular plan and stick to it. Hammer one nail home. Don't buy every advertising opportunity that comes along, even if it looks like a bargain.

Shall I use manufacturers' advertising? By all means, if it is good. But use it as a help to your own. Stamp your own individuality on the campaign. Do everything you can to appropriate to your own benefit the money the manufacturer is spending to advertise and popularize his own goods. But give it a turn to your store always. Make it yours. Digest it. Use the cuts he sends you; use even the wording sometimes, but assimilate the thought and use it again in your own way.

Distribute his booklets, but also make your clerks read them. It will give them new selling power for you.

Use the manufacturer's signs and window displays. They cost you nothing and if the line of goods is worth letting into your store, it is worth letting out again.

The best place to get the live copy for your own advertisements is on the floor of your store. Find out what your customers say. Answer in your advertisements the questions your customers ask in your store.

Finally, the language of your advertisement. Shall it be serious or playful, prose or jingle, epigrammatic or smooth-flowing phrases? I should say, let it be adapted to the subject; let it say what you mean without any ambiguity and let it give the impression of you and your store which you would like people to have. If you want them to think of you as a clown you can easily adopt a style which will give them that impression.

RETAIL HARDWARE DOINGS.

NEW RETAIL HARDWARE STORES.

Makoti, N. D.—E. T. Kamrud has opened in the vehicle and hardware business in this city.

Kempton, Illinois—It is reported that Mr. Lottinville has purchased a hardware store in this place.

New Bethlehem, Pa.—The McEwe Hardware Company of this place have now opened for business.

Ossian, Indiana—Shepherd & Sparks, the new hardware firm, is now open for business.

Waterville, Me.—Rollins & Dunham have engaged in the hardware business.

Gary, Indiana—Gary Hardware Company of this city have been incorporated with a capital of $6,000. Directors, Jacob J. and Carrie B. Marks and Thomas Berkanowic.

BUSINESS CHANGES.

Pulaski, Ohio—H. W. Michael purchased the grocery and hardware business of J. H. Davidson.

Camden, S. C.—The hardware business of A. D. Kennedy has been purchased by Messrs. W. F. Malone, W. R. Young and W H. Pearce.

Carlisle, Indiana—J. Frank Alumbaugh and his son, Harry Alumbaugh, sold the hardware, buggy and harness business of the J. Frank Alumbaugh & Co. to C. A. Griffin.

Knightsville, Indiana—Davis & Dickson, owners of a department store, purchased the hardware and furniture store owned by Eckles Bros.

Thomasville, Tenn.—The Crutchfield Hardware Company will erect a brick building.

Bellefonte, Pa.—J. L. Mauer of Tyrone has associated himself with his son Raymond and will open a first-class hardware store in the Hale Block.

Silver City, Iowa—George W. McMillen sold his hardware and implement stock in this city to Caudell Bros. of Conception, Missouri.

Bradley, Oklahoma—Messrs. Ball & Brown have taken charge of the stock of hardware and groceries which they purchased of Hitchcock Bros.

Hammond, La.—C. W. Anderson, President of the Hammond Hardware Company, is reported to have purchased the four stores of T. S. Baltzell in Cypress street, and will occupy them January fist.

Hastings, Iowa—McFarland & Hatfield, implement and hardware firm, dissolved partnership, Mr. McFarland retiring from business.

Alvin, Texas—J. W. Crouch's hardware store is being moved into the building just vacated by the Idle Hour Theatre.

Noblesville, Ind.—Hill & Co., hardware and furniture, have decided to retire from business. Stock has been sold, O. H. Hill and L. L. Hankley being the two principal stockholders.

Reinbeck, Iowa—Robinson Bros., general hardware and furniture, have been succeeded by Robinson & Gauge.

Burlington, Michigan—Christopher Katz, Jr., has bought from George C. Cole his stock of hardware.

Vandalia, Mich.—Kantz & White have been succeeded in the hardware business by Kantz & Dool.

Walled Lake, Mich.—K. L. Long has purchased the stock of hardware formerly handled by Dickerson & Co.

Albion, Neb.—Claude Creekpaum has disposed of his retail hardware and implement business to Paul Krause.

Madison, Neb.—Fred Beidinger has disposed of his implement business to Louis Walkenhorst and W. A. Stringfellow, who will carry it on under the style of Stringfellow & Walkenhorst.

Lostine, Oregon—The A. & A. Hardware Company is erecting a new warehouse and will remodel its store.

Rice Lake, Wis.—Bruce Stewart has bought out the hardware store of William Konrad.

Dunlap, Iowa—T. L. Craft of the firm of Craft & Davis, hardware merchants, has sold his interest to D. V. Moore.

MISCELLANEOUS.

Pittsburgh, Pa.—The Arndt Hardware Company was damaged by fire.

Colton, Cal.—The warehouse of the Colton Hardware Company was recently destroyed by fire. The loss was reported to have been $5,000, of which $2,000 was covered by insurance.

Columbus, Ohio—The store of the Love Hardware & Plumbing Company was damaged by fire. The loss was reported to have been about $1,000.

Deering, Kansas.—The Ladd hardware store was burned. About half the $1,800 stock was saved. Insurance will probably cover the loss.

Canton, Kansas.—Frank Park made an assignment for the benefit of his creditors. M. L. Clark has been appointed trustee to close out stock of hardware and implements.

Severy, Kansas.—W. E. Bidwell, who has been in the hardware and piano business here, has closed his store.

Hagerstown, Pennsylvania.—Shindel, Rohrer & Co.'s hardware store was robbed of a quantity of goods.

Humboldt, Tennessee.—The Tennessee Hardware Company has been incorporated with a capital stock of $20,000.

San Dimas, California.—Thieves robbed the hardware store of Foresman & Hoke of about $300 worth of knives, guns, silverware, etc.

New Germany, Minnesota.—Oscar Mielke's hardware store at this place was burned to the ground, everything being totally destroyed.

Edgar, Nebraska.—Chas. J. Humphrey has disposed of his hardware business.

Belle Vernon, Pennsylvania.—Partnership between Chauncey S. Duvall and John Vance, doing business as the Vance Hardware Company at this place, dissolved by mutual consent on November 7, 1912.

Tampico, Illinois.—Fred W. Smith, formerly an active partner in the well-known old hardware firm of A. Smith & Bro., retired from the firm on account of poor health.

New York, New York.—William T. Kugler, dealer in hardware, has filed a petition in bankruptcy, with liabilities of $2,471.

New Haven, Connecticut.—The Pfleghar Specialty Hardware Company is about to add a brass foundry building to its plant.

San Dimas, California.—The hardware store of Foresman & Hoke here was robbed. The valuables taken amounted to about $300.

Mt. Carmel, Pennsylvania.—Sanner Hardware Company suffered a loss by fire. Loss was reported to have been about $2,000.

WARM AIR FURNACE SITUATION

In presenting this review of the warm air furnace situation, AMERICAN ARTISAN is following a long established custom. The Furnace Special issue appears annually toward the close of each year, and deals in comprehensive fashion with the general conditions existing in the warm air furnace industry. An edition of this kind must contain matters of interest not only to the manufacturer but also those who are directly engaged in the sale and installation of warm air furnaces. In gathering material for this issue, therefore, AMERICAN ARTISAN has not depended upon either its fundamental knowledge of conditions or upon the voluminous mass of data which is constantly pouring into the office of a trade journal, but has endeavored to secure first hand and up-to-date information by means of a wide and extended correspondence carried on with those actually engaged in the manufacture and sale of warm air furnaces.

The opinions of these individuals and companies are what forms the most accurate gauge of conditions, and when they have been collected and placed in definite and concrete form, the whole range of information is such as to make a most invaluable work of reference for any who are at all interested in any phase of the warm air furnace business.

In order to furnish some basis for the views of furnace manufacturers and dealers, AMERICAN ARTISAN submitted to them a number of questions, allowing a considerable latitude, but also concentrating just the most important features. The questions and the answers given are reproduced. Many of those written to, however, did not confine their answers wholly to the questions, but discussed various other pertinent and important details, and in order to give publicity to all of the things thus brought out, we are also printing some of the letters received, in addition to extracts from the letters. The year which is just closing has been a very important one in the warm air furnace field, as will be disclosed by some of the communications. It is earnestly hoped the coming year 1913 will witness a further development of this great and important industry, and that the interchange of ideas contained in this Furnace Special issue may have some direct bearing upon the all-to-be-hoped-for result.

EXTRACTS FROM LETTERS RECEIVED FROM MANUFACTURERS.

COMPARISON OF FURNACE SALES THIS YEAR WITH PREVIOUS YEARS.

The extracts from the various letters indicate that there has been quite an increase in the furnace sales for the current year of 1912. Only one or two furnace manufacturers disagree with the general verdict, which is that the present year will mark a gain of all the way from 10 to 20 per cent in sales of furnaces.

Q. How do the furnace sales made for 1912 compare with those of 1911 and previous years?

"There has been a 20 per cent increase in our sales this year over last year."

"The furnace sales for 1912 will far exceed those of 1911. Our reasons in making this statement is that there has been much more building."

"Our sales have decreased one-tenth."

"Sales of furnaces are increasing steadily, but our tabulation is not sufficiently complete to be able to determine the percentage of gain for the year 1912."

"Our sales have increased fully 50 per cent."

"Our sales for 1912 are much ahead of 1911 and any previous years."

"Up to September first of this year our sales have increased more than one-twelfth. In addition, we have sold about 20 per cent more boilers and furnaces, and 400 per cent more than last year, making a total increase on heaters of 250 per cent, or, in other words, two and one-half times as many the first eight months of this year over eight months of 1911."

"Our sales are ahead of 1911, with prospects of quite a further increase."

"Trade with us is very satisfactory at this season of the year; rather better, perhaps, than last year. The trouble appears to us to be in the fact that dealers largely follow the lines of least resistance and too many of them work on the price question alone. Still, there are decided exceptions to this, and the campaign of education which is going forward in the trade journals will, we think, improve this condition."

THE MOST PROFITABLE FURNACE FIELD.

Furnaces are as a rule confined a great deal to the immediate territory where the furnace manufacturer is located. It is interesting to note, however, that a great many manufacturers report that they are gradually extending their field. Furthermore, it is worth calling attention to that the Central States are still holding their own as the most profitable field, and and many manufacturers outside of that territory investigating the great possibilities for business there.

Q. In what particular section of the country are you recording the greatest furnace sales?

An Iowa manufacturer says: "The increase has been general throughout our entire territory."

A Massachusetts manufacturer of ranges and furnaces says: "Our sales are made mostly in New England and Eastern New York. We make a sale occasionally in other localities where a buyer desires a strictly high class furnace."

An Illinois manufacturer of furnaces, boilers and furnace supplies states: "Our sales are chiefly in the States of Illinois, Wisconsin, Iowa and Michigan, although we make shipments to practically every State in the Union."

A Cincinnati firm of heating and ventilating engineers say: "The great increase in our furnace sales and supplies has been in the South."

Another Ohio firm says: "Most of our furnace sales are in Michigan. We have many dealers

throughout the whole State, and are developing it exclusively."

"The Mississippi Valley and the Missouri has been our best field for furnace sales during the past year," says an Iowa manufacturer of furnaces.

Another Cincinnati firm states: "Although we have furnaces in every State in the Union, the majority of our sales are within 300 miles of Cincinnati."

Another Ohio manufacturing firm writes: "Our greatest number furnace sales have been in Ohio and Pennsylvania."

A manufacturer of central Michigan says: "We sell practically all of our furnaces in the northern central states, but we hope to branch out in the East and West."

A manufacturing firm of New York City writes: "The states of New York and New England have the highest record of furnace sales with us."

DEFECTIVE FURNACE INSTALLATION IS DECREASING.

Manufacturers seem to be rather divided in their opinion relative to defective installation of furnaces. About half of the replies received indicate that defective furnace installation still seriously affects the furnace business. On the other hand, quite a number of replies take the optimistic viewpoint that the dealers are becoming more familiar with furnace installation and realize the evil effects which a poorly installed furnace can have upon the industry in general.

Q. Do you think that defective furnace installation, which has, undoubtedly, had a bad effect on the warm air furnace business in the past, is increasing or decreasing?

"Undoubtedly, defective furnace installation still has a bad effect upon the warm air furnace business."

"Defective installation has been the cause of hot air furnace business being a drag in the past, and the retail dealer does not acquaint himself with these evils."

"We do not see much change or improvement in the furnace installation, and judging by the orders which we receive for furnace pipes and fittings to be used in connection with furnaces, we see great need of study on the part of furnace installers, in order to make correct sizes of pipes and registers as well as furnaces which may be used."

"Defective installations have had a bad effect on the business, but in our own case we note a decrease in such installations as we are making a strong endeavor to operate the doctrine of adequate installations through our furnace literature."

"The defective furnace installation is decreasing."

"There is lots of poor work being put in, not so much through ignorance but because the other fellow does, at the present time, but still there are lots of local dealers that are putting in much better work than ever before."

"I think that dealers are becoming more familiar with furnace installation and the detrimental effect it has had on the furnace business is decreasing."

"We have found it difficult to interest dealers who handle stoves and ranges in the installation of furnaces."

"We believe that poor installation is being overcome and that dealers generally recognize that future business depends upon good work."

RETAIL DEALERS ACQUAINTED WITH EVILS OF DEFECTIVE INSTALLATION.

That retail dealers can scarcely help becoming familiar with the evils resulting from defective installation is the opinion of nearly all manufacturers heard from. Many manufacturers, however, qualify this by stating that though they are aware of the evils, competition is so strong that they are apt to forget it when going after a certain job. Several manufacturers give a great deal of credit to trade journals for educating the furnace dealers along this particular point. It is suggested that the manufacturers themselves help the dealers by making suggestions from time to time.

Q. Are the retail dealers as a whole thoroughly familiar with the evils resulting from defective installation?

"Dealers very often, in order to secure a contract away from the other fellow, install too small a furnace to do the work expected from it, and the consequence is that the furnace is condemned—branded as "No good." This can only be remedied by being able to figure out the number of square feet of air to be heated, considering the kind of building (brick, stone, cement or frame). The location of same as to high places when not protected by other buildings or floors. Also to install the proper size register and pipes. Have the shorter pipes towards the West and North, if possible, and above all things have the journeyman tinner, who thoroughly understands the furnace business, to do his work."

"Retail dealers are more familiar with the evil resulting from defective installation."

"Retail dealers have become more familiar with the fact, during the past three or four years."

"All furnace dealers should be familiar with the evils existing in the business, as the various trade journals have published a large amount of information in recent years for the purpose of securing better installation of warm air furnaces. Owing to the fact that comparatively few salesmen employed by furnace manufacturers are qualified to instruct dealers as to proper furnace installation, its progress along this line will be slow."

"The retail dealers, as a whole, seem to be more alive to the evils of defective installation, but the competition to cut prices in order to secure the order is strong, and profit is sometimes a second consideration."

"The trouble is that the large majority of dealers do not know what good work is and all they are thinking about is getting the job away from somebody else, no matter whether they have to cut their own work all to pieces to do it, or not."

"The manufacturers can help the retail dealer by making suggestions, and I believe that this is done more generally than in former years."

"Some dealers are familiar with the increasing number of 'would-be' mechanics that are taking up furnace installation."

"Retail dealers are not familiar with the evils re-

sulting from defective installation and a few seem to care."

"Furnace manufacturers, the trade journals and organizations have been able to change all of these conditions very much in the last few years."

"A very large percentage of the retail dealers are not only unfamiliar with the installation of furnaces but they lack executive business ability."

THE QUALITY OF FURNACES MOST IN DEMAND.

The answers received to the question regarding the quality of furnaces most in demand appear to indicate that there was a greater demand for medium priced and cheap warm air furnaces. The replies show that the house-owner himself has a tendency to order high grade furnaces, but when left to the contractor or builder, cheaper furnaces are always ordered.

Q. Do the better grade of furnaces appear to be more in demand than the cheaper grade, at the present time?

"Price is a great object, and cheaper furnaces are in good demand."

"We think that the medium priced furnaces have the largest call."

"There is an increasing demand for a better grade of furnaces, a fair percentage of the better class of houses being erected and installed with furnaces."

"There is a large demand for good furnaces, but some people do not care what they buy as long as they get their price."

"They most surely are. They give entire satisfaction when properly installed."

"The better class of furnaces are, without question, coming to the front, especially when sold to the house owner in place of through the contractor or builder."

INSTALLING FURNACES OF INADEQUATE SIZE.

Although there appears still to be some little trouble with dealers who install furnaces of inadequate size, manufacturers are gradually overcoming this difficulty by watching the dealers closely—impressing upon them the necessity of using furnaces of ample size and making the necessary computations for them. By furnishing the dealers with reliable data, this evil is gradually being lessened.

Q. Do you have any trouble with dealers installing furnaces of too small a size to properly heat a specified area?

"We frequently have trouble with dealers installing furnaces of too small a size to properly heat a specified area."

"We occasionally learn that furnaces of our manufacture have been installed in sizes too small to furnish the necessary heat, but as a rule we endeavor to impress upon our dealers the necessity of using furnaces, piping and registers of ample size in order that every job may be a success."

"We always have to watch our dealers closely to see that they use large enough furnaces."

"The dealers always want to heat a big house with a little bit of a furnace."

"No. The dealers send us information and data from which we compute the proper size."

"We assist our dealers to compute the proper size furnace."

"We believe that dealers are more apt to make mistakes in the ventilating system of a heating plant and thereby install furnaces of too small a size."

"Without any reliable data to guide them, many dealers habitually install furnaces of too small a size."

CO-OPERATION WITH THE RETAIL FURNACE DEALER.

Co-operation with retail furnace dealers may best be secured by supplying them with advertising matter for distribution is the general trend of the replies. Every reply received, however, shows that the manufacturers are most aware of the importance of co-operation with the dealers, and are anxious to receive suggestions from them.

Q. In what way would you suggest that the manufacturers can help the retail dealers increase their furnace sales?

"By co-operating with the dealer and helping him to handle individual prospects."

"We make a general campaign of advertising to assist the retail dealers."

"We believe that manufacturers can assist dealers in making sales by employing a better class of salesmen with practical experience in the furnace line and also in supervising the installation of the jobs and furnishing plans to the dealer in cases where he cannot be reached conveniently by a competent salesman."

"We assist our dealers and supply them with furnace literature which is plain and understandable. We also give definite and accurate information as to capacities of furnaces, and simple methods for determining the proper size of register and piping."

"By having the retail dealers and agents send the prospective buyers' names to the manufacturers and let them take it up."

"We keep our dealers going with dodgers, flyers and printed matter that will be really helpful and not the ordinary kind of dope that the average furnace man gets."

"The manufacturer must be willing to co-operate with, as well as educate the dealer to install furnaces properly, in order to do a successful business."

THE RELATIVE MERITS OF STEEL AND CAST FURNACES.

The viewpoint of the manufacturers upon steel and cast furnaces, of course, is naturally biased by the kind which they themselves make, and many refuse to reply definitely to this question because of the fact that they manufacture only a single kind of furnace. From the number of specific replies received, however, steel furnaces appear to have a slight shade the best of the argument.

Q. What, in your opinion, are the relative merits of steel and cast furnaces?

"In our opinion steel furnaces are of far more value than cast iron."

"We advocate the use of steel and hard-iron steel furnaces by burning hard coal, and all-cast furnaces for burning soft coal."

"We think that steel furnaces are much better than cast iron; for instance, last week we had several exhibits in Ohio State Fair and more than two hundred parties informed us that their fire-bowls had cracked and that they would have to replace them, or install other furnaces. Some of these furnaces had been in

several years, some only five, and quite a few from two to three years,—which goes to show that the cast iron furnace will crack and also that it is impossible to tell where the flaw may be."

"Regarding the relative merits of steel and cast furnaces, we believe that depends somewhat upon the fuel used. We think that a combination of steel and cast iron is the successful furnace for hard coal. For soft coal we would use cast furnaces."

"Regarding the relative merits of steel and cast iron furnaces, we beg to say that as we manufacture nothing but all cast iron furnaces, this is rather an intimate sale subject as far as we are concerned, and you can readily appreciate what our attitude is on this question."

THE VALUE OF STEEL RADIATORS.

The question of using steel radiators with cast iron for other parts meet with most divided opinions. The replies indicate that manufacturers either have most divided opinions upon the subject, or they do not care to discuss it at all, for many makers would not answer the question. Those opposed offered the different ratios of expansion and contraction as their objection.

Q. Do you favor a steel radiator with cast iron for other parts?

"We do not deem it a good idea to place steel radiators, or domes, as they are commonly called, on cast iron parts as the expansion and contraction is not the same and, of course, the result is a dirty, smoky, sooty house."

"We emphatically do not favor a steel radiator with cast iron for other parts. We prefer all steel, or all cast iron."

"We recommend the use of steel radiators with cast iron for other parts, when hard coal is to be burned, but believe that cast iron radiators go better with a soft coal fuel."

"We believe in steel radiators with cast iron for other parts."

THE USE OF SMALLER SIZE FURNACES INSTEAD OF STOVES.

The opinion is almost unanimous that smaller size furnaces are now being substituted for heating stoves a great deal, and it is freely expressed that the coming year will see this substitution even more in evidence than during the year 1912. It is pointed out that many stove companies are now entering the warm air furnace field, and that this proves the increased popularity of furnaces.

Q. Are smaller size furnaces being substituted for heating stoves to any great extent?

"In our opinion, the substitution of smaller size furnaces for heating stoves has been in small cottages and bungaloos."

"Undoubtedly, furnaces are displacing stoves in many parts of the country. An evidence of this fact is the entry into the furnace manufacturing field of many of the older stove houses, who note the trend and favor their warm air furnaces throughout the inferior communities in which they largely sell their production."

"Smaller size furnaces are being used more or less in place of heating stoves, but not to as great an extent as they will be the coming year."

"Our experience is that the warm-air furnace is being more and more generally used, and is growing in popularity in all sections."

"We think that there are more furnaces being substituted for heating stoves than ever before."

"In this section the substitution of smaller size furnaces for stoves is increasing."

THE DEPRECIATION OF A FURNACE.

Most manufacturers concur in the opinion that the depreciation of furnaces is from 5 to 10 per cent annually, and, therefore, we have only printed a few of the many replies received. These all vary from 5 to 10 per cent, making the life of the furnace from 10 to 20 years.

Q. What is the average percentage of depreciation for furnaces, over a period of years?

"In taking an inventory of a furnace every year, we believe in a depreciation of 5 per cent."

"As near as we can make out, there is a depreciation of 10 per cent per year on a good furnace, although an all cast iron furnace will make a better showing."

"From our experience, we figure that the average percentage of depreciation on a furnace for a year is 8⅓ per cent; in other words, the life of the furnace is 12 years."

THE USE OF FIRECLAY IN FIREBOXES.

Again the question of using fire clay in fire boxes appeals to manufacturers only as it applies to their own furnaces, and the answers indicate that the experience of the various manufacturers on this point has been widely divergent. The opinions are about equally divided between those who favor fire clay in fire boxes and those who think it objectionable.

Q. Have you any objection to the use of fireclay in fireboxes, and why?

"Inasfar as fireclay is in a heat conductor, it is a detriment to heating and has no place in a warm-air furnace."

"A No. A-1 furnace does not require a fire clay lining, which would be detrimental in more ways than one."

"We have used firetile with the best success."

"We have no objection to the use of firebrick in furnaces, and the same is necessary in some of the steel constructions now on the market, as a protection to the steel."

"We have never seen any test with reference to the efficiency of such firepots, but the fact that they are made by some of the representative furnace manufacturers would indicate that they have rendered good service."

"We believe that a firebrick lining in a firepot insulates the heating surface, which is most valuable. Experiments along this line demonstrate the fact that a firepot lined with firebricks is about 20 per cent less efficient than the plain cast iron pot."

"Clay in a firebox we think is objectionable, because it has to be replaced so often and because it is a non-conductor of heat, and the firepot should be the best radiating surface on the entire furnace."

IMPROVEMENTS IN FURNACES.

That improvements in warm air furnaces must constantly be made to keep pace with the developments

in the industry is the opinion of practically all who made replies. Many manufacturers pointed out the fact that they have made many important improvements during the past year, while not a few expect to greatly better their line of furnaces during the coming year.

Q. Have you made any improvements in your furnaces during the past year?

"We are continually improving our furnaces and have made one important change during the past year."

"We have no improvements to announce in our lines for 1912, the last changes in our construction having been made in 1910. We expect, however, to have an entirely new line of furnaces ready for the market in the Fall of 1913, of which due announcement will be made in your columns."

"We are continually making improvements in our line of furnaces. We believe in keeping our product modern and up-to-date."

"We are keeping pace with the most modern developments in furnaces."

THE PROGRESS OF WARM-AIR FURNACE HEATING COMPARED WITH STEAM AND HOT-WATER HEATING.

Warm air furnaces are holding their own, despite the strong competition of steam heating and hot water heating, according to the majority of replies received. In some territories it is reported that warm air furnaces are gaining a great deal on their competitors, and it is said that a larger percentage of gain has been made over the steam and hot water heating than has been accomplished for ten years.

Q. Do you find that steam heating and hot-water heating is effecting the warm-air furnace field as much as formerly?

"No, sir; hot water and steam heat is not affecting our sales and we have no trouble in convincing the people we want to sell to that warm air is better."

"Steam and hot-water heating is doing no damage to warm-air furnaces. Statistics claim larger percentage over these two systems at present than ten years ago, and business for the coming year looks or seems to far exceed this."

"We believe that the competition of steam and hot-water heaters with the warm-air furnace is just as great now as at any previous time, and in many sections of the country, owing to ignorance or carelessness of furnace dealers, steam and hot water have almost entirely supplanted the warm-air furnace."

"We do not think that steam and hot-water heating is affecting the furnace business so much as formerly, and we feel that efforts made to better the installation of furnaces will still further remove this 'bugbear' of the furnace man."

"I think we are gaining ground on the hot-water system as well as steam. It is slow but sure."

"I think that we have got the steam and hot-water people on the run, more than we ever had before."

"The warm-air furnace is in its infancy and we will look for great things in the next five years."

"There is an increasing demand for warm-air furnaces in the better classes of buildings, which have heretofore favored hot water or steam."

THE OUTLOOK FOR NEW BUSINESS.

Nearly every manufacturer believes that the year 1913 will be one of the banner years in the warm air furnace industry. The enormous crops and the fact that there is a tremendous amount of building scheduled seems to indicate that furnace manufacturers will have a large increase in sales. Optimism is the keynote of all the letters received.

Q. What is the general business outlook for the coming year?

"The general business outlook for 1913 is excellent. We do not believe that the election has had any considerable effect on business, but there is a danger of a top-heavy credit business, the same as before the panic of 1907."

"We consider the business outlook for the coming year as being excellent, and the only cloud on the horizon is the possibility of tariff agitation by Congress, which might lead to a contraction of credits. The business of the country is now on such an enormous scale that all of the loanable capital of the country is needed in the transaction of business, and any limitation of credit would prove a serious handicap to furnace manufacturers, as well as others."

"The outlook for the coming year is bright. There is more building planned and going forward than there has been for several years."

"The general outlook from present indications is mighty good for next year. If the coming winter proves to be as cold as the last one, next season all furnace manufacturers will have fully 25 per cent increase in sales."

"We are very optimistic and are certainly looking for a good business in the coming year."

LETTERS FROM MANUFACTURERS.

The following letters which have been received from prominent manufacturers of warm-air furnaces deal directly with the developments in the warm-air furnace situation and open up some very interesting facts:

FROM A FURNACE MANUFACTURER IN WESTERN NEW YORK.

"Trade with us is very satisfactory at this season of the year—rather better, perhaps, than last year. Undoubtedly defective furnace installation still has a bad effect upon the warm-air furnace business. The trouble appears to us to be in the fact that the dealers largely follow the lines of least resistance, and too many of them work on the price question alone. Still, there are decided exceptions to this, and the campaign of education which is going forward in the trade journals will, we think, improve this condition. There is, perhaps, a tendency to improve the cheaper grade of furnaces, but the very expensive grades do not sell as well as they should. This is due to the conditions above mentioned and to the fact that high-grade furnace installation is not so systematically advertised in the popular journals as is steam and water heating.

"We think the manufacturers are alive to any suggestions you may put forward to help the retail dealers, but we are sorry to say that many of the retail dealers look upon the furnace business as a side issue, and really depend upon the manufacturer's representative to sell the heater on their behalf. It has sometimes seemed to the writer as if the manufacturers of furnaces who deal direct with the customer are reaping the cream of the business, on account of the inertia of the local dealers. This is not as it should be. We find that all kinds of heating, both with warm air and with steam and hot water is increasing, and it naturally must, as sections of the country grow more and more wealthy and people demand more luxury. Our own feeling is that the outlook for business for the coming year is good."

FROM A MICHIGAN FURNACE MANUFACTURER.

"Replying to your recent favor we can say that our sales for 1912 are 50 per cent ahead of 1911. We sell practically all our furnaces in the northern central states. We believe that poor installation is being overcome and that dealers generally recognize that future business depends on good work. A very large percentage of the retail dealers are not only unfamiliar with the installation of furnaces, but lack executive business ability. The better grades of furnaces are, without question, coming to the front, especially when sold to the home owner in place of through the contractor or builder. We believe that dealers are more apt to make mistakes in the ventilating system of the heating plant than by installing furnaces of too small a size. The manufacturer must be willing to operate with, as well as educate the dealer to install furnaces properly in order to do a successful business. We believe, first, last and always, in an all cast iron furnace. As steel and cast iron does not expand and contract evenly, there is, in our opinion, no place for the combination steel radiator, except on account of price. We think that there are more furnaces being substituted for heating stoves than ever before. As near as we can make out, there is a depreciation of 10 per cent per year on a good furnace, although an all cast iron furnace will make a better showing In as far as fire clay is not a heat conductor, it is a detri ment to heating and has no place in the warm-air furnace.

"We are continually improving our furnace and have made one important change during the past year. In our field, hot water and steam is not affecting our sales, and we have no trouble in convincing the people we want to sell that warm air is better. The general business outlook for 1913 is excellent. We do not believe that the election will have any considerable effect, but there is a danger of a top-heavy credit business, the same as before the panic of 1907. We would especially recommend that dealers confine themselves to a cash business as much as possible, and that they refer plans and specifications to the manufacturer before making bids on any difficult heating plan. So much depends on the proper installation of a heating plant that even a small furnace will give surprising results for fuel economy, as well as heating, when properly planned and installed."

FROM MOORE BROTHERS COMPANY, JOLIET, ILLINOIS.

"The general trend of the furnace business, as indicated by our experience, is for more and better installations in practically every section of the country. There are a number of furnaces being put in in rural districts as well as in the cities, and it would be difficult to pick out any particular section where this would apply more markedly than in another. One of the greatest causes of the unpopularity of furnaces, in the past, has been faulty installation. By this is meant a poor class of material, too small pipes and fittings, poor workmanship and improper location of registers and pipes. The furnace manufacturers, the trade journals and such organizations as the Federal Furnace League have been able to change all of these conditions very much in the last few years, and whereas we certainly have not arrived at the desirable state of perfection in furnace installation, yet the direction in which we are going, and at the rate at which we are going, should be a source of satisfaction. There is no question but what dealers appreciate why a good furnace may go wrong in a house, and, as a result, it is often noticed that they go to the other extreme in insisting on large furnaces, if not large fittings. It is rarely that a dealer is found who will put in too small a furnace—that is, speaking of the average dealer in the moderate sized towns throughout the country—but many of them do not yet appreciate the necessity of proper sized piping.

"There are two distinct classes of furnace trade. One consists of the furnace man who installs work in large cities where job building is going on and where a good deal of building for sale is being carried on. This class of furnace men handle a cheaper grade of furnace, and, as a rule, installations are not of the best. The other class of furnace men make by far the biggest bulk of the furnace trade. He does furnace work in the average sized town throughout the country, puts in from three to a dozen furnaces a year, and he aims, as a rule, to put in as good work as he knows how. He handles what he thinks is a good furnace, and is open to reason along lines which will better the general furnace situation. As to the relative merits of steel and cast iron for furnace work: This is rather an intimate sale subject so far as we are concerned, as we manufacture nothing but all cast iron furnaces, and you can readily appreciate what our attitude is on this question. As to fire clay in the firepots. We never have used it, as our firepots are entirely of cast iron, which obviates the necessity of using any sort of a protector from the heat. As stated before, our experience is that the warm-air furnace is being more and more generally used and is growing in popularity in all sections. The business outlook, so far as furnaces are concerned, of course depends, like all other products, on general business conditions. We are very optimistic and are certainly looking for a good business the coming year."

FROM R. J. SCHWAB & SONS COMPANY.
MILWAUKEE, WISCONSIN.

"Regarding the volume of sales of this company, will say that our sales on warm-air furnaces, up to September 1 of this year, is more than 50 per cent increase over last year. In addition to this, we have sold about 20 per cent more boilers than furnaces. The increase over last year on boilers is about 400 per cent, making the total increase on heaters 250 per cent, or, in other words, two and one-half times as many the first eight months of this year as we sold the first eight months of last year. Our sales on furnaces, naturally, are mostly in the four or five states that are covered by representatives near us. There is no question but what defective furnace installations have had a detrimental effect on the sale of furnaces. I think the dealers are becoming more familiar with furnace installation. The manufacturer can help the retail dealer by making suggestions, and I believe that this is done more generally than in former years.

"Regarding the relative merits of steel and cast furnaces, we believe that depends somewhat on the fuel used. If a combination of steel and cast iron in the radiator can be made with tight joints, that is, in our estimation, the most successful furnace for hard coal. For soft coal the all cast furnace is preferred. In our opinion a lining of firebrick is a detriment rather than a help. The cast iron firepot is certainly the best. It is a sharper heater and does not clinker up same as the brick-lined firepot does. The sale of hot-water and steam boilers is undoubtedly having their effect upon the sale of furnaces. The larger and better class of residences are using more hot water than furnaces in proportion to what they were some years ago. In our opinion this is brought about more from the fact that the furnace manufacturers have cheapened their product in order to make the price lower and have not given enough attention to the installation of the same, and not because the hot-water system of heating is better. We believe that each system has its place, but, on the whole, the hot-water system has superceded the warm-air, not only in such places as they should have, but have trespassed upon a field of heating that could be as well taken care of by the warm-air furnace. At the same time, the warm-air furnace is being installed in a class of houses that were formerly heated by stoves, so that probably the total sales of warm-air furnaces is much larger than ever."

FROM WALKER & PRATT MANUFACTURING COMPANY,
BOSTON, MASSACHUSETTS.

"Our furnace sales for 1912 will be larger than for any previous year. Our sales are made mostly in New England and eastern New York. We make a sale occasionally in other localities where a buyer desires a strictly high-class furnace. Defective installations undoubtedly have a bad effect on the business, but in our own case we note a decrease in such installations, as we are making a strong endeavor to spread the doctrine of proper and adequate installations through our furnace literature. The retail dealers, as a whole, seem to be more alive to the evils of defective installations, but the temptation to cut prices in order to secure the order is strong, and profit is sometimes a second consideration. There is an increasing demand for a better grade of furnaces; a fair percentage of the better class of houses being erected are being heated with furnaces. We have very little trouble with our dealers as regards installing furnaces of too small a capacity. Our ratings are definite and understandable, and remove the element of guesswork that is so often necessary where furnaces are rated by the cubic foot rule.

"The manufacturers can help the retail dealers increase their furnace sales by sending out furnace literature that is plain and understandable, with definite and accurate information as to capacities of furnaces and simple methods for determining the proper size of registers and piping. They can also help a whole lot by using all the influence possible to stiffen the backbone of those retail dealers so that they will insist on getting a price for the work that will admit of executing same properly and with a fair profit. Satisfactory work means profit to the dealer, results to the buyer and good business in the long run. We believe that an entire cast iron furnace gives greater durability and more even results. The steel radiator is a quick heater, but is liable to leak gas, and corrodes quickly where there is any dampness. One reason why there are so many small, cheap grade furnaces being sold is the fact that people who formerly did their heating with stoves have discarded that method of heating for the furnace. There are large numbers of two and three-flat houses being erected which are heated by the cheap grade of furnaces and fittings, and most of the occupants of these houses formerly used stoves. The life of a good, substantial, cast iron furnace should be from twenty to forty years, depending on the use it receives and where it is located. The life of a furnace with a steel radiator is from five to twelve years under the same conditions.

"We do not believe in brick-lined firepots. A firebrick lining in a firepot insulates the heating surface that is most valuable. Experiments along this line demonstrate the fact

that a firepot lined with firebricks is about 20 per cent less efficient than the plain cast iron pot. We are continually making improvements in our line of furnaces. We believe in keeping our product modern and up to date. We do not think that steam and hot-water heating is affecting the furnace business so much as formerly, and we feel that efforts made to better installations of furnaces will still further remove this bugbear of the furnace man. The outlook for the coming year is bright. There is more building planned and going forward than there has been for several years."

FROM THE EXCELSIOR STEEL FURNACE COMPANY, CHICAGO, ILLINOIS.

"Sales of furnaces are increasing steadily, but our tabulation is not sufficiently complete to be able to determine the percentage of gain for the year 1912, as the shipping season has just now opened. Our sales are chiefly in the states of Illinois, Wisconsin, Iowa and Michigan, although we make shipments to practically every state in the Union. We do not see much change or improvement in furnace installation, and, judging by orders which we receive for furnace pipe and fittings to be used in connection with furnaces, we see great need of study on the part of furnace installers in order that the correct sizes of pipes and registers as well as furnaces may be used. All furnace dealers should be familiar with the evils existing in the business, as the various trade journals have published a large amount of information in recent years for the purpose of securing better installation of warm-air furnaces. Owing to the fact that comparatively few salesmen employed by furnace manufacturers are qualified to instruct dealers as to proper furnace installation, the progress along this line will be slow.

"Inasmuch as we manufacture one grade of furnaces only, we are not in a position to determine whether or not dealers are installing more high-grade furnaces than in previous years, but we sincerely hope that this is the case, as every good job is an advertisement for the industry as a whole, while every poor job is a knock against the warm-air furnace. We occasionally learn of furnaces of our manufacture which have been installed in sizes too small to furnish the necessary heat, but, as a rule, we endeavor to impress upon our dealers the necessity of using furnaces, piping and registers of ample size in order that every job may be a success. We also advocate the use of double wall pipe in every job in order that the heat generated by the furnace may be delivered to the rooms to be heated and not dissipated in the partitions, the tests of the Underwriters' Laboratories of double and single pipe demonstrating conclusively the much greater efficiency of double wall pipes. Such pipes are now made with interlocking joints and can be installed at one-tenth of the labor cost of single pipe wrapped with asbestos paper, and therefore there is no longer any excuse for a furnace dealer installing single pipe in any partition. Should he do this he is working against the interests of the furnace business and inflicting loss upon the furnace user owing to the fact that jobs installed with single pipe require a much larger quantity of fuel than those installed with double pipe. Manufacturers can assist dealers by employing a better class of salesmen with practical experience in the furnace line, and also in supervising the installation of jobs and furnishing plans to the dealer in cases where the dealer cannot be reached conveniently by a competent salesman. They can also help the business in general by declining to sell goods to a man who persists in improperly installing the same. They can help the dealers by urging them to secure fair prices for their work, so that they can afford to use the best materials and do the work in the proper manner.

"We advocate the use of steel or part iron and steel furnaces for burning hard coal, and all cast furnaces for burning soft coal. We favor the use of steel radiators with cast furnaces when hard coal is to be burned, but always recommend cast iron radiators for burning soft coal. Undoubtedly furnaces are displacing stoves in many parts of the country, and evidence of this fact is the entry into the furnace manufacturing field of many of the older stove houses who note the trend in favor of the warm-air furnace throughout the interior communities in which they largely sell their product. The life of a first-class furnace should be at least fifteen or twenty years. We have in use in the city of Chicago scores of furnaces made in the year 1886 which are still giving good service and which have cost their owners very little for repairs during the twenty-six years they have been in existence. We know, however, of furnaces which are made with such light firepots and radiators as to last not more than two or three winters, and there should be some method of preventing the installation of such furnaces.

"We have no objections to the use of firebrick in furnaces, and the same is necessary in some of the steel constructions now on the market as a protection to the steel. We have never seen any tests with reference to the efficiency of such firepots, but the fact that they are made by some of the representative furnace manufacturers would indicate that they have rendered good service.

"We have no improvements to announce in our line for 1912, the last changes in our construction having been made in 1910. We expect, however, to have an entirely new line of furnaces ready for the market in the fall of 1913. We believe that the competition of steam and hot-water heaters with the warm-air furnace is just as great now as at any previous time, and in many sections of the country, owing to the ignorance or carelessness of furnace dealers, steam and hot water are almost entirely supplanting the warm-air furnace. We consider the business outlook for the coming year as being excellent, and the only cloud on the horizon is the possibility of tariff agitation by Congress, which might lead to a contraction of credits. The business of the country is now on such an enormous scale that all of the loanable capital of the country is needed in the transaction of business, and any limitation of credit would prove a serious handicap to furnace manufacturers as well as others."

FROM A FURNACE MANUFACTURING COMPANY IN MICHIGAN.

"In answer to your various inquiries will say, in a general way, that our sales this season are now ahead of the same time last year. Without going into the matter rather carefully it is difficult for us to state in just what sections the increase occurs, but we are, however, inclined to believe that the greatest increase will be west of Chicago. There is no doubt but that defective furnace installation has had a serious effect upon the furnace business as a whole. Whether or not this is on the increase at the present time, we are unable to say. We believe that the retail dealers, as a whole, are familiar with the evils resulting from defective installation, but there are a great many who do not look for the cause, but simply assume that the furnace is defective. We believe that the better grades of furnaces are again slowly coming into their own, but the cheaper grade has certainly had a large run in recent years, due largely to the fact that in all of the larger cities and towns, price has been the only consideration.

"Without any reliable data to guide them, many dealers habitually install furnaces of too small a size, where they would not if they had proper rules to guide them. We believe that the manufacturers can best help the retailers by a campaign of advertising reaching the consumer. This is necessary to offset the work done by the water and steam people. In regard to the relative merits of the all cast and the part cast and part steel furnaces, will say that this depends a great deal upon the kind of fuel to be used and the use the furnace is intended for. In regard to the use of fire clay and brick for lining the firebox, will say that this materially decreases the effectiveness of the best radiating part of the furnace, and we do not believe in it. The general business outlook for the year appears to be good."

FROM THE EAST OHIO HEATING & ROOFING COMPANY, YOUNGSTOWN, OHIO.

"In our opinion, the furnace sales for 1912 will far exceed those of 1911. The reason for making this statement is that there has been more building this year by at least 20 per cent than last. We are practically only starting in the furnace business, and consequently our sales are in and around our home city. Defective installation has been the cause of hot-air furnace business being a drag in the past, and the retail dealer does not acquaint himself with these evils: First, in his selection of a good furnace; and second, he has never made the furnace business a study, which, in our estimation, is one of the most essential points in the furnace business. A poor grade of furnace will give satisfaction for a short time if properly installed, but sales from these never repeat, while a good furnace properly installed will be satisfactory in every way and requires very little soliciting to make sales.

"Dealers very often, in order to secure a contract away from the other fellow, install too small a furnace to do the work expected from it, and the consequence is the furnace is condemned, branded as no good. This can only be remedied by the dealer being able to figure the number of square feet of air to be heated, considering the kind of building (brick, stone, cement or frame), the location of same as to high places when not protected by other buildings or forest; also to install the proper size registers and pipes, have his shorter pipes toward the west and north if possible, and above all things, have a journeyman tinner who thoroughly understands the furnace business to do his work, or be Johnny on the spot to superintend it.

"Sheet steel cannot be compared with cast iron (or steel) furnaces. And we do not deem it a good idea to place sheet steel radiators, or domes, as they are commonly called, on cast iron other parts, as the expansion and contraction is not the same, and, of course, the result is a dirty, smoky, sooty house. Heating stoves are losing out, as furnaces are taking their place, and should, as careful investigation shows that a house can be heated for about 30 per cent more than one room can with a heating stove. A good furnace, properly installed and properly taken care of, will last, it is known, for from 18 to 25 years, or even more. An A No. 1 furnace does not require a fine clay lining; such a lining is detrimental in more ways than one.

"The furnace business is growing very rapidly, due to

the careful watch of the manufacturer for improvements. We have made some, and will make more as we go along and find where changes are necessary. Steam and hot-water heating is doing no damage to warm-air furnaces—statistics claim a larger percentage over these two systems at present than ten years ago, and the business for the coming year looks or seems to far exceed this."

FROM A FURNACE MANUFACTURER IN MICHIGAN.

"Our sales for 1912 are much ahead of 1911 and previous years, in the territory that we are working almost exclusively —Michigan, Indiana, Ohio and Illinois. We think that defective furnace installation, as a whole, is decreasing. There is lots of poor work being put in, not so much through ignorance, but because the other fellow does at the present time, but still there are lots of local dealers who are putting in much better work than ever before. The trouble with defective installation is that the large majority of installers do not know what good work is, and all they are thinking about is getting the job away from somebody else, no matter whether they have to cut their own work all to pieces to do it or not. If they would think more of what they are going to make on the job, put a good, big price on it so that they could afford to do good work, and then learn how to plan work and put it in as it ought to be, the warm-air furnace industry would be much advanced. The demand is almost as large as it has been right along. There is a demand for good furnaces, and some people don't care what they put in as long as they can get the other fellow's price on it. On a whole, however, there are more high-class furnaces being installed now than ever before.

"For effective co-operation get the retail dealer to come to the factory, and have the manufacturer get out with the retail dealer more. Keep the retailer going with dodgers, fliers and printed matter and stuff that will be really helpful, not the ordinary dope that the average furnace man gets. Both steel and cast iron are good furnaces. Personally, we like the cast furnaces best, or the cast and steel combined. The former is better for soft coal, while the latter works better with hard coal or with coke if it is not fired too heavily—that is, if the furnace is figured large enough for the house so that it does not have to be forced beyond its capacity. The question in regard to cast iron and sheet iron is largely a matter of talking point and opinion. A good cast iron furnace will heat as it ought to, and a good sheet iron furnace will do the same. It is largely a matter of opinion, and I do not believe that it cuts much of a figure when you get the furnace installed and put in right. Small furnaces are being substituted to a large extent for heater stoves, for the percentage of small houses—houses of mechanics, clerks and the people that ordinarily use stoves—is growing year by year. Clay in firebox we think objectionable because it has to be replaced so often, and because it is a non-conductor of heat and the firepot should be the best radiating surface on the entire furnace. If you shut the heat off from radiating through the pot itself, then you cut down the radiating surface to such a great extent that there is going to be a big waste up the smokepipe and chimney. The worst feature of any furnace is a fire brick or fire clay firebox, as there is not enough radiating surface put up above the firepot to take care of all of the warm air which is generated. We think that we have got the steam and hot-water people on the run more than we ever have had before. It looks mighty good."

FROM THE LENNOX FURNACE COMPANY, MARSHALLTOWN, IOWA.

"Sales are ahead of 1911, with prospects of quite a further increase. The increase has been very general throughout the entire territory. We think the effect of poor furnace installation on the sales is about the same as it has been in the past, not noticing any marked change either way. Some of the dealers are familiar with furnace installation, but the increasing number of would-be mechanics who are taking up furnace installation does not have a tendency to better same. We find an increasing demand for the better grade of furnaces, except in the larger towns. We always have to watch our dealers closely to see that they use large enough furnaces.

"By the manufacturers keeping the retail dealer informed regarding the various weaknesses in installation and by having competent salesmen they are able to go out and assist the various dealers in not only selling, but looking after the installation as well.

"There are two different constructions, both serviceable, but for high-class work the only construction is one that is absolutely gas and dust-tight. A steel radiator in a cast construction, if properly made, is as satisfactory as any radiator. Smaller sized furnaces are being used more or less in place of heating stoves, but not to as great an extent as they can be. We have no objection to a clay firebox. We have been improving our furnaces every year as fast as we can discover any improvements that can be made. We find that there is an increasing demand for warm-air furnaces in the better class of buildings, which have been favoring hot water or steam in the past. The business outlook for next year, as far as we can forecast at the present time, is very favorable."

EXTRACTS FROM RETAILERS' LETTERS

COMPARISONS OF FURNACE SALES THIS YEAR WITH OTHER YEARS.

As was the case with the manufacturers, the retail furnace dealers appear to have had a big increase in sales, compared with those of last year. The majority of dealers compared business merely with the year 1911 and did not discuss the business before that date, but the mere fact that there was an increase over 1911 should prove highly encouraging.

Q. How do the furnace sales made for 1912 compare with those of 1911 and previous years?

"Our furnace sales for 1912 are less than for 1911 and 1910. This is, however, due to local conditions only."

"Our furnace sales for 1912 over 1911 have increased fully 20 per cent."

"The year 1912 was the best year we have ever had, both in furnace sales and general hardware supplies."

"We have been in the business two years. The furnace sales for this year and the prospects are much better than last year and the first year."

"Our furnace sales have gone one-half better than last year."

DEFECTIVE FURNACE INSTALLATION.

The answers to the question regarding defective furnace installation indicate that the dealers themselves are fully alive to the danger resulting from defective installation, and many retailers think that there is very little progress being made in installation, on account of the tendency of the consumers to obtain the cheapest work. Consequently, it is argued that the installation falls into the hands of men who are totally unfamiliar with the elimentary principles of installing furnaces.

Q. Do you think that defective furnace installation, which has, undoubtedly, had a bad effect on the warm-air furnace business in the past, is increasing or decreasing?

"Defective furnace installations are being made, but I think the regular trade is doing better work. The chaps that make the trouble are the 'botch' mechanics. They are no mechanics at all, and the hardware dealers that sell furnaces have any old Tom, Dick or Harry put them in."

"We think that defective furnace installation is increasing, due to the consumer who, instead of buying the best and paying for proper installation, will figure with all the dealers and the 'cheap John' wins."

"I think it is on the decrease, because people have had all kinds of experience from their own furnaces and their neighbors', and the prospective buyer will now go to the furnace man who has a good reputation."

"Defective furnace installation seems to be on the increase, and a great many people do not know the merits of a good furnace and good installation, but are only looking for price. This encourages that kind of work."

"Defective furnace installation is decreasing in our own locality."

"From our own experience, we believe that there is

not much improvement in furnace installation where it is being done for real estate or general builder, but when the householder is having a job done for himself we think the tendency is to pay a better price to have the work done by someone who will install a furnace that will prove entirely satisfactory."

"We think that defective furnace installation is decreasing. People are getting educated to the fact that there is a vast difference in furnace installation."

"For twenty years we have been installing furnaces of a good many different kinds and makes, and we sincerely believe the hot-air furnace, as made and installed today, is more firmly intrenched and stands better in the general business opinion than ever before. We think the main reason for this is that the dealer is better posted in the practical principles of heating than ever before. While good workmanship has also to do with the appearance of the job, yet the main problem is to get heat into the buildings, and the least expense for the operation of same is of first importance. To lay the job out properly, to use the proper size heater, to get a good smoke flue, and to get a good return circulation of cold air with the correct size pipe, are all of vital importance. No matter how good the workmanship may be or how good a furnace is used, if these essentials are disregarded, the job is more or less a failure, to the discredit of the furnace used, and furnace heating in general."

EMPLOYING COMPETENT MEN FOR INSTALLING FURNACES.

It is the prevailing opinion that many incompetent men are being employed by the retail dealers to install furnaces. The reasons for this are many and diversified. It seems to be very hard to secure competent furnace men, but in many cases the reason is given that the retailers themselves know very little about furnaces, and, consequently, are not able to oversee their employes properly. The opinion is freely expressed that the retailer must first become absolutely familiar with the installation of furnaces before attempting to set them up, even in cases where he is confident that he has good and capable mechanics.

Q. Do the retailers employ competent help in installing?

"Good help will be found in most cases where the retailer is a good mechanic himself and knows how a good job ought to look."

"We are of the opinion that the men who install furnaces are capable mechanics, but do not study the furnace problem as they should. I might also say that retailers themselves do not give the matter any attention. They are after the money, and the less the cost of installation, the more profit."

"It is hard for us to secure competent furnace men, but we can get many who are willing to work under instructions."

"We find in many cases that many hardware men just going into business have not learned the trade as pertaining to installation of furnaces."

"The retailers employ competent help in the installing of their work, but it is the cheaper 'outside shops' that cause the trouble."

"Those who make a study of this work and are willing to stand back of every job, do employ competent help. Those who try to see how cheap they can do the work, do not."

"As many retailers cannot distinguish good work from poor work, it stands to reason they cannot pick competent men."

"The majority of the retailers know nothing about furnaces nor the installation of them, and their employes are indifferent as to results—just as long as they get their pay."

"We think the retailer should be competent to lay out the furnace job himself, and as to competent help, we think every retailer tries to get the best help he possibly can. Every man who has been in the furnace business for some time knows that in the long run it pays to get the best help. However, the retailer cannot control the labor market. Especially in the busy time of the year it is hard to get competent help."

QUALITY OF FURNACES MOST IN DEMAND.

According to most of the replies, medium priced and cheap furnaces are in most demand at the present time, although many express the opinion that good salesmanship, added to confidence in the furnaces handled, will help to dispose of a much better grade of furnaces. It is also stated that the householder himself wants to buy the best grade of furnaces, but the builders and contractors lean to the cheaper grade.

Q. Do the better grade of furnaces appear to be more in demand than the cheaper grade, at the present time?

"Cheap and medium priced furnaces are in demand at present."

"We have sold a better grade of furnaces to the trade, outside of the real estate dealers' province."

"With us the price comes first and foremost—and later our customers consider quality."

"We believe that a retailer can sell a better grade of furnace if he has confidence in his goods and is a persistent salesman."

"We sell only a high grade of furnaces and our sales for 1912 have advanced fully 10 per cent."

"We think with the householder the tendency is to buy the better grade of furnace, but not so much with the builders and real estate men."

HELPING THE DEALER INCREASE SALES.

It is not strange that dealers all have most emphatic and decided opinions as to the various ways in which manufacturers can help them increase sales. Some of their ideas are most interesting and should be helpful to the manufacturers. It is pointed out that advertising is not the only way to help the dealer, although it is a great help, but that there are many other ways in which cooperation may be extended.

Q. In what way would you suggest that the manufacturers can help the retail dealers increase their furnace sales?

"Our sales could be greatly increased if the manufacturers will use the advertising mediums in our locality."

"We think the manufacturers could help the retailer by protecting the trade to which the business really belongs; by educating a man how to make perfect installations; by giving conservative ratings on the

capacity of furnaces; furnish tables for the proper size pipes for rooms, and by furnishing complete methods of getting the jobs computed correctly and the right size of furnaces for the buildings to be heated. This would give the retailer many satisfied customers, which would be additional advertising aids for future orders."

"Manufacture two grades of furnaces and mark them so the consumer is protected against substitution by the dealer. We think this would make better sales for the best grade of furnaces."

"By co-operating with the customers and also sending representatives who are familiar with installation. With the assistance of an able salesman we have made record sales in one day."

"We think that the manufacturer could help the retail dealer by giving better prices, which would leave the dealer a larger margin."

"By educating the consumers to the fact that they are not compelled to put in a steam or hot-water plant to get satisfactory results."

"Our manufacturer has supplied us with blueprints for every installation. This has been a great help to us."

RELATIVE VALUE OF STEEL AND CAST FURNACES.

Widely divided opinions were received relative to the merits of steel and cast furnaces. Some dealers state that they have used steel furnaces to better advantage; others prefer cast furnaces, and some are absolutely impartial. A review of a few of the replies received should prove interesting.

Q. What, in your opinion, are the relative merits of steel and cast furnaces?

"We have always preferred cast, but in some cases have used steel furnaces with success."

"If the given fuel is to be used, we can quickly decide the merits of steel and cast furnaces."

"We think that the longevity of cast iron furnace is greater than that of steel."

"We believe the cast iron furnaces are far more desirable when soft coal is to be used."

"We consider an extra-heavy steel furnace, with cleanable jacket, superior to any."

"My ideal is either an all cast iron furnace with all cast iron radiator—radiator not to be too heavy—and made in two sections, or an all steel furnace with firebrick lining. I think fire will burn brighter against a wall of firebrick than against a wall of cast iron or steel."

OPINIONS ABOUT STEEL RADIATORS.

The views of dealers seem almost unanimous on the fact that steel radiators should not be used with cast iron for other parts. Most replies indicate that the dealers do not favor any combination of the metals, preferring either all cast iron or all steel. One dealer states that an all-cast radiator is specified for soft coal burning and all-steel radiator for wood or anthracite coal.

Q. Do you favor steel radiators with cast iron or other parts?

"I favor all cast furnaces with horizontal cup joints. Of course, the manufacturer should use good judgment as to the shape of the castings and make allowances for contraction and expansion."

"I do not favor a combination of metals. Steel radiators are quite satisfactory for hard coal."

"We think a steel radiator is better than a combination of metals, because it is a fuel saver and heats rapidly."

"We always specify all cast radiator for soft coal burning and all steel for wood or hard coal."

"I do not believe that the joints can bind tightly for any length of time when a steel radiator is used with cast iron for other parts."

THE SUBSTITUTION OF SMALL FURNACES FOR HEATING STOVES.

The answers were pretty equally divided on the question of whether small furnaces are being substituted for heating stoves, showing that this is something which follows certain localities. In some localities there is no substitution whatsoever, and in other territories dealers note that stoves are being discarded for small warm air furnaces.

Q. Are smaller size furnaces being substituted for heating stoves to any great extent?

"There has been no substitution of small size furnaces for heating stoves in this locality, except in the school rooms."

"A great percentage of our furnace work is in old houses where stoves are being discarded for hot-air furnaces."

"Very little if any substitution is being noted."

"A great many people in our neighborhood are leaning toward small furnaces."

THE USE OF FIRECLAY IN A FIREBOX.

As a whole, dealers seem to have rather definite opinions as to the use of fire clay in a fire box, being mostly an improvement, and in some cases a detriment to the efficiency of the whole furnace. There are one or two dissenting opinions, however. The most representative replies are printed below.

Q. Have you any objections to the use of fireclay in a firebox, and why?

"I object to fireclay in a firepot, as it requires frequent renewal and is not necessary if the firepot is a good cast one and the furnace is not so small that it has to be forced, as is the case with most jobs."

"We think that fireclay in a firepot is a protection to the firebox, but would not like to depend entirely upon it."

"I have always failed to see where a fireclay lining will save any heat or any expense."

"We would not buy a furnace with a clay firepot. Years ago we experienced considerable grief in this line."

"We do not think that fireclay in the firepot radiates the heat as well as the cast iron alone."

"We want firebrick linings in every all steel furnace."

ENCROACHMENTS MADE BY STEAM AND HOT-WATER HEATING.

The answers to the question relative to steam heating and hot water heating affecting the warm air furnace field again indicate, as was the case with several other questions, that this is largely a matter of locality. In some neighborhoods the warm air furnace business seems to be increasing very rapidly, while in others

it has received serious set-backs from the steam and hot water systems. One dealer points out the fact that poor installations made in the past render it very difficult to convince customers that warm air furnaces are best. The fact, however, that the replies are so evenly divided would indicate that the warm air furnace is holding its own.

Q. Do you find that steam heating and hot-water heating are affecting the warm-air furnace field as much as formerly?

"I do not think that the hot water and steam heat affects the warm-air business quite as much as it did some years ago. The lower price of warm-air heat is in its favor, and if the manufacturers will get good, honest men to sell their furnaces, and men who are practical and take a little more interest as to how their furnaces are getting installed, and educate, if possible, the people in general through advertising as to what really constitutes an ideal furnace business, then the warm-air furnace will, in my opinion, forge ahead of other heat, especially for residence heating."

"In our opinion, the warm-air furnace can never compare with hot water, as the free movement of cold air when the fire goes down will always be an objection. Also, when the furnace gets partly burned out, it leaves the smoker gas. This is an objection against the hot-air furnaces and which is not present when a hot-water boiler is used."

"On account of the very poor hot-air installations made here, it is very difficult for us to convince the people that the average house can be heated best by 'hot air.'"

"We wish to say that the warm-air heating is a leader over steam or hot-water systems in this city. When a warm-air system is installed properly it has many advantages over any other kind. First, such as unsightly radiators in rooms the year around and dirty walls everywhere. Second, in most residences no provision has been made for taking cold air from the fumes. Third, cost is about double in installing. Fourth, cost is about double for fuel; and last, but not least, a steam or hot-water system calls for constant attention."

LETTERS FROM RETAILERS.

FROM TORBETT & GERMOND COMPANY, WACO, TEXAS.

"We are doing nothing like the furnace business in 1912 that we did in 1911. We are practically out of the heating business this year from the fact that the work is being done so cheaply that there is nothing in it, and one cannot afford to install good jobs at the present prices. We are resting on our oars until we can get prices that will justify the best of workmanship and materials. If the furnace manufacturers ever expect to get up much enthusiasm among the sheet metal contractors, we think they will have to quit installing and let this go to the sheet metal contractors. We know that they say they have to do installation on account of no one handling their goods, getting them installed properly, etc., but such is not the case. They can always find a competent man or firm to do the work, closer than their factory, and we do not think they should do it in their home towns. They can get some one there to do it. The real season that they install them, in our opinion, is the price proposition. They themselves cut the life out of the business to beat their competitor out of the sale, and have as much to do with the demoralization of the business as anyone, if not more so. In their advertising matter they state, 'We have our engineer, etc.' If they have they could furnish the layout and see that the furnace was installed accordingly. We will install anyone's furnace that is sold in this city and is not handled by someone here, and do it according to their instructions, regardless of any furnace we are handling, and do them justice."

FROM POWERS BROTHERS & COMPANY, CHICAGO, ILLINOIS.

"Our 1912 sales on furnaces are ahead of 1911 at this period. We believe that there is not much improvement in furnace installation where it is being done for real estate men or general builders, but where the householder is having a job done for himself, we think the tendency is to pay a better price to have the work done by someone who will install a job that will prove satisfactory. Those who make a study of this work and are willing to stand back of it do employ competent help. Those who try to see how cheap they can do the work do not. We think with the householder the tendency is to buy the better grade of furnace, but not so much so with the builders. We believe the cast iron furnaces are far more desirable. We do not think the fireclay radiates the heat as well as the cast iron. We recommend combination furnaces with hot-water radiators in rooms which are distant from furnace or where it is difficult to heat with hot air, and use hot air for balance of house, but we find the tendency by many of the dealers in installing this kind of work is to use too small a water heater and too small pipes for the hot-water runs, and not enough care in seeing that the water pipes are not trapped."

FROM R. J. DEEDS, PETERSBURG SHEET METAL WORKS, PETERSBURG, ILLINOIS.

"There is a slight increase in furnace sales for 1912. I think that defective furnace installation is increasing, due rather to the consumer, who, instead of buying the best and paying for proper installation, will figure with all the dealers, and "Cheap John wins." It is my opinion that the men who install furnaces are capable mechanics, but do not study the furnace problem as they should. I might also say that the retailers themselves do not give the matter any attention. They are after the money, and the less the cost of installation, the more profit. The makers should manufacture two grades of furnace, but mark the two furnaces so the consumer is protected against substitution by the dealer. I think this would make better sales for the best grades of furnaces. I favor the cast furnace always, although, of course, a good steel furnace is better than a poor cast furnace. The former is easier repaired, will not need repairs as often, cheaper repairs, as with most steel furnaces, and the firepot and body are all in one piece. Most of the users will use the furnace as long as the gas does not run them out. When the firepot burns out of a cast furnace they must get a new one; when it burns out of a steel furnace they "never noticed it" until the steel body is burned through, then it calls for a new furnace, all but a few of the trimmings. I think fireclay is all right as a protection to the firebox, but would not like to depend entirely on it. Practically no steam or hot-water jobs are being installed now where hot-air furnaces would be a success."

FROM THE M'QUESTEN & SAWYER COMPANY, MUSCATINE, IOWA.

"We are glad to give you our idea relative to the furnace work in our vicinity. The year 1910 was a banner year for us, as a local strike during 1911 suspended building and naturally would decrease furnace sales, otherwise business for 1912 would be on the increase. Defective furnace installation seems to be on the increase, and a great many people who do not know the merits of a good furnace and a good installation, but are looking for price, encourage this kind of work. We get most of the high-grade work in our vicinity. The retailers employ competent help in the installing of their work, but it's the cheap outside shops that make the trouble. The better grade of furnaces are in equal demand with the cheaper ones. The manufacturers can help the retailers by making better furnaces and by giving the dealers better prices. We have no use for steel furnaces and have never installed such. For certain fuels we favor the steel radiator, but for soft coal and heavy firing an all cast furnace is better. We would not buy a furnace with a clay firepot; years ago we experienced considerable grief in this line."

FROM A. H. MUTSCHLER, MIDDLEBURG, PENNSYLVANIA.

"Furnace sales for 1912 are less than for 1911 and 1910. However, this is due to local conditions. Defective furnace installations are being made, but I think the regular trade is doing better work. The chaps who make the trouble are the 'botch' mechanics, and no mechanics at all, and the hardware stores that sell furnaces and have any old 'Tom, Dick or Harry' put them in. The good help will be found in most cases where the retailer is a good mechanic himself and knows what a good job looks like. Cheap and medium priced furnaces are in demand the most, as, if you figure on the best furnace and installation, it comes up so near to steam or hot-water heat that they will get it. The manufacturers can help the retailers by protecting the trade that the business really belongs to, and educating these men as to how they should install the furnaces, by giving conservative ratings of capacity of furnace, tables for the proper sizes of pipes for rooms, and by furnishing complete methods of getting the jobs figured right, and the right size of furnace for the building to be heated. One of the greatest drawbacks to the furnace is that the size of the pipes and furnaces are guessed at, and, in most cases, the pipes and furnace are too small.

"I favor all cast furnaces with horizontal cup joints. Of course the manufacturer should use good judgment as to the shape of the castings and make allowance for expansion and contraction. I object to fireclay in the firepot, as it requires frequent renewal and is not necessary if the firepot is a good cast one and the furnace is not so small that it has to be forced, as is the case with most jobs. I rather think that the hot water and steam heat does not affect the warm-air heat quite as much as it did some years ago. My reason is this: Hot water and steam heat, when in its infancy, was only tackled by the best fitters who were in the trade, or, in other words, before a man would undertake to install a hot-water job he would generally serve an apprenticeship of sufficient length to feel sure that he was capable to do the job. If he had any doubt about figuring the radiation and boiler suitable for the building, he would have the boiler agent come and help him, and if you will look the matter up you will find there are nearly all practical men selling boilers for the manufacturer or jobber. The agent would show him how to run the piping, etc., and there was very little chance for a mistake. But now it is more like the warm-air men—most anyone with a little mechanical talent who helps to put in a dozen or so jobs is ready to jump in and do furnace work or hot-water heating, and, of course, he does not take into consideration cost of doing business, etc. Therefore he cuts prices and then the rest follow. So today there are hot-water jobs put in that are not satisfactory, and, indeed, quite a lot of them. The lower price of warm-air heat is in its favor, and if the manufacturers will get good, honest men to sell their furnaces, and men that are practical, and take a little more interest as to how their furnaces are being installed, and educate, if possible, the people in general through advertising as to what really constitutes an ideal furnace job, then the warm-air furnace will, in my opinion, forge ahead of other heat, especially for residence heating."

FROM N. W. MANROW, GOSHEN CORNICE WORKS, GOSHEN, INDIANA.

"In response to your request that I express my opinion of the hot-air furnace business as affecting the dealer, manufacturer and user, I will say that in my opinion anything that affects the one has its effect on the others. They must all swim or sink together. For twenty years we have been installing furnaces of a good many different kinds and makes, and we sincerely believe the hot-air furnace as made and installed today is more firmly intrenched and stands better in the general public opinion than ever before. I think the main reason is that the dealer is better posted in the scientific and practical principles of heating than ever before. While good workmanship has all to do with the appearance of the job, yet the main problem is to get heat into a building at the least expense, for the operation of same is of the first importance. To lay the job out properly, to use the proper size heater, to get a good smoke flue and to get a good return circulation of cold air with the correct size pipes are of vital importance. No matter how good the workmanship may be or how good a furnace is used, if these essentials are disregarded, the job is more or less a failure, to the discredit of the furnace used and furnace heating in general.

"Furnace sales are coming easier every season. Formerly the dealer had to convince his customer against doubts and prejudices, but now about all you have to do is to receive his order, install the job, and take his money. In my opinion there is not much defective installing at present, except with new beginners who are inexperienced and who to my knowledge are making some bad mistakes. There are a few manufacturers who will place an agency with anyone who will buy a furnace or two, even with parties who are not mechanics, or even with merchants, with the result that with a few failures or partial failures, in a few years they will have some hard-earned experience, but to the detriment of the furnace business in general. I think the retailer should be competent to lay out the furnace job himself, and, as to competent help, I think every retailer tries to get the best help he can. Every man who has been in the furnace business for some time, knows it pays to get the best help obtainable, as it is the cheapest, all things considered. However, the retailer cannot control the labor market; especially in the busy time of the year it is hard to get good help. As to the grade of furnace, I think this is largely up to the dealer. Nearly all manufacturers have an ideal—a standard of excellence of their own. We have used some high-priced furnaces which gave no better results than some other medium-priced ones. My ideal is either an all cast iron furnace with all cast iron radiator—radiator not too heavy and made in two sections—or an all steel furnace with firebrick linings. I think fire will burn brighter against a wall of firebrick than against a wall of cast iron or steel.

"A great percentage of our furnace work is in old houses where stoves are being discarded for hot-air furnaces. We use inside circulation, and, in addition, use about one-fourth of the cold air from outside, regulated by a wind shield and damper, taking the foul air off the floor either by use of fireplace or registers in baseboard, using space between studding to attic, sometimes connecting same in attic to chimney, other times emptying same in attic. This system of heating we consider much more healthful than the ordinary hot-water installation, with considerable less expense to install, for which reasons we find the steam and hot-water heating for residences is not affecting our business as much as formerly.

"With record-breaking crops in nearly all agricultural staples, and all lines of trade having a prosperous aspect, the American farmer, merchant and mechanic aspires to more comfortable and luxurious homes, which must be heated, and I see no reason why the hot-air furnace business should not receive the lion's share for the coming year, which it justly deserves."

FROM WILLIAM F. LAMPRECHT, MARENGO, OHIO.

"Previous to last year I was not in business, but furnace sales this year and the prospects are much better than in 1911. I cannot say whether defective furnace installation is becoming lessened, but it must decrease soon. Some people are getting educated to the fact that there is a vast difference in furnaces and installation, while a great many think that a furnace is a furnace, and, consequently, take the cheapest. Some retailers don't know a good job from a poor one and cannot tell whether they have good help or not. The manufacturer can help the retail dealer by using a selling plan whereby they draw blueprints for the job and see that it is correctly installed. They must not trust a furnace job to a man who has escaped from apprenticeship after a short time and calls himself a tinner or furnace man.

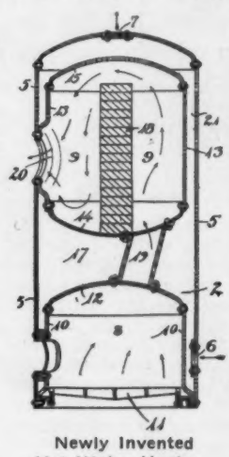
"I consider an extra-heavy steel furnace, with jacket that can be cleaned, superior to any. In Marengo, steam and hot-water heat is affecting the warm-air furnace field on account of the very poor hot-air work done here, although I think in a few more years it will be possible to convince some people that the average house can be better heated by means of hot air. I am somewhat young in the business, but my advice is—figure a furnace large enough, estimate pipes and register of a sufficient size, make the installation as near perfect as possible, and get a reasonable profit on your work. If your competitor wants to scrimp the job and cut the price, let him do so. He will not even get a 'thank you' for it, especially if the job goes a trifle wrong, or, as is often the case, gives no results whatever."

FROM THE LATHROP FURNACE COMPANY, SAN ANTONIO, TEXAS.

"Let the furnace manufacturers bring out the fact that thousands and tens of thousands of lame hot-water and steam-heating systems have had to be bolstered up to do their work efficiently. This has been done by manufacturers of heating specialties, under the head of Sealed and Vacuum systems, and raising a water system to higher than steam, or 240 degrees Fahrenheit."

A VERTICAL HOT-WATER HEATER PATENTED

United States Patent No. 1,046,178 has been granted to Alexander Grant, of New York, N. Y., for a hot water heater. The new hot water heater consists of an exterior shell provided at the top with a water outlet and it has in the side a smoke-out. There is a fire box in the lower part of the exterior shell to produce an intervening water space. The fire box is provided with a crown sheet and there is a smoke drum just within the upper part of the hot water heater. The smoke drum is provided with a closed crown sheet with a bottom head. The crown sheet of the fire box and the bottom head of the smoke box are in opposite relation to each other, which produces between them a horizontal water leg which is in free communication with the water space.



Newly Invented Hot-Water Heater.

There is a smoke flue extending through the horizontal water leg which connects the smoke box with the smoke drum and also a smoke deflector extending upwardly from the bottom head of the smoke drum.

The Progress of the Stove and Furnace Industry.

The city of Troy, New York, is holding a series of lectures on various commercial topics and one of the most interesting of the entire number was a resumé of the stove and furnace industry delivered on December 3, 1912, by Walter P. Warren, President and Treasurer of the Fuller and Warren Company, Troy, New York. Mr. Warren is a former president of the National Association of Stove Manufacturers and has been very active in the stove and furnace trade, so that he is specially qualified to discuss the subject. Although his address reviewed this industry in Troy, it was broad enough to prove extremely interesting to all who are identified with the heating and ventilating field. His address in part follows:

Walter P. Warren, President and Treasurer of the Fuller & Warren Company, Troy, New York.

To Philo Penfield Stewart must be accorded those improvements and inventions that converted the stove of early days into the modern and effective cooking apparatus now manufactured and used by the public.

The name of Mr. Stewart is interwoven with the fortunes of the Fuller and Warren Company, for during his entire business career, covering many years, he was associated with them designing and superintending the construction of the various stoves known by his name.

In the spring of 1832, he conceived the idea of making a cooking stove, which he called the Oberlin stove. This was made of sheet iron and was his first experiment in cooking stove making. In December of 1836, Mr. Stewart and his wife arrived at his home in Vermont. Then and there, he commenced planning the celebrated P. P. Stewart summer and winter cooking stove. Starbuck and Company were the first firm that undertook to manufacture the Stewart stove. They did not succeed in the undertaking, and finally an arrangement was consummated with the predecessors of the firm of Fuller, Warren and Company to make Mr. Stewart's stove. At that time, it was small and needed enlargements. It was Mr. Stewart's study to make arrangements for an improved reservoir and back closet. It was not until 1859 that he obtained the patents on his large oven and airtight summer and winter cooking stove, and through the efforts of the company, it became a complete success.

It is not a misnomer to designate the manufacturing of cook and heating apparatus as an art, and the principles upon which they are manufactured are so similar that it is necessary to consider them together as they pass through many stages from conception to completion.

The first and important step is the consideration of the requirements of the purchaser and their adaptability to an article that will prove successful in operation, economical in fuel, pleasing in appearance and so constructed that it may be produced at a cost that will insure a profitable return to the manufacturer.

For instance, in the construction of a first-class cooking stove or range, careful consideration must be given to the making of the patterns to insure adaptability to molding, mounting and finishing, and to properly accomplish these important features, careful drafts to exact measurements must be made, and from which drafts a complete stove in every particular is constructed in wood exactly in size, design and general appearance to the proposed article when finished and ready for the market.

DESIGNS THE RESULT OF STUDY AND EXPERIENCE.

Such drafts and designs must be the result of careful study and expert experience so that the best results may be obtained with the least cost of labor and fuel.

These wood patterns are then reproduced in iron, brass, aluminum or other metal and carefully fitted to an exactness that might seem unreasonable to an inexperienced observer, but is absolutely necessary for the production of a perfectly operating first-class stove. Many stoves, however, find their way upon the market that do not possess this essential care in construction, and therefore often prove disappointing and costly to operate.

After the metal patterns are finished, they are carefully and accurately fitted on a horizontal or flat

framework of wood; this process is termed "bedding," and then the patterns are ready for molding.

The principal materials used in molding are sand of various kinds, loam, plaster of paris, etc. Sand is the most common, and certainly the most perfect and convenient material. It is superior to all other materials for molding, being more or less porous and very refractory, so that hot metals do not melt or bake it. These qualities are of great importance in the successful operation of stove molding.

There are three distinctions in molding in sand—green, dry and loam. Green sand molding is generally applied to light iron castings, such as stove plate, hollow ware, etc. If hot metal is allowed to be in immediate contact with fresh sand, the sand will partially melt, or, if the sand is coarse, the hot metal will penetrate into the surface between the grains, and the castings in consequence will be rough. To overcome this difficulty, the face of all molds is generally covered with an article termed "facing," consisting of coal dust, black lead, anthracite or charcoal dust. This will prevent in a great measure the burning of the sand and consequent roughness of the casting. Soapstone powder is a very efficient means of preventing the burning of the sand where thin castings are made, such as stove plate.

For molding stove plate in green sand as well as in dry sand, boxes or flasks are used. They may be made of iron or wood. Such flasks generally consist of two parts representing the upper and lower sides of a box, and are connected on the outside of each flask with hooks fitted to eyes, which serve to connect the two sides of the flask as firmly as possible. Wooden boxes cost less than those of iron, but are more expensive in the course of time, as they are liable to burn.

SOME POINTS OF VITAL IMPORTANCE.

The brands of pig iron used and the cupola or melting practice are points of vital importance in the manufacture of stove plate, and the mixing of different irons is a subject of considerable interest; experiments are necessary to determine the proper grades of iron and their proportions to secure strength, economy and adaptability. The cupola has the advantages of melting iron more cheaply than any other furnace. It is a very convenient apparatus, as large or small amounts may be melted in a short time with comparatively small amount of fuel.

Floor or bench molding is a very laborious calling, and, until within a few years, the aid of machinery has not been applied to relieve manual labor. At the present time, however, molding machines of various description are being introduced in foundries all through the country where iron and brass molding is being conducted. The continued introduction of such aids to manual labor have been difficult because of the unwillingness of organized labor to adopt the aid of machinery, which is unfortunate, for machinery has added dignity to labor, because it has added power to man to accomplish great results.

MODERN METHODS OF HEATING.

Superseding in a great degree the heating stove of the present day, the introduction of warm air furnaces, steam and hot water heaters has become an important adjunct to the manufacturer of stoves; and the heating and ventilating of public buildings and private residences has developed into an important branch, and is receiving a significance dictated by the requirements of both health and comfort.

The human body requires to be kept at a temperature of 98 degrees in order to sustain the life processes, and loses its heat in a colder medium. This heat is economized by clothing or the supply of warmth by other sources.

Apartments lose their heat at a rate proportional to the excess of their temperature above the outside atmosphere; and, through the imperfections of buildings, also through the walls, floors, windows, doors, ceilings, etc., at the rate proportionate to the conducting power of the materials of which they are composed.

To renew the constantly disappearing heat with pure air to breathe, without sensibly reducing the temperature arises the important question of ventilating, for impure air does not affect the senses as directly as a falling temperature.

We all know that pure air contains a certain proportion of oxygen and carbonic acid. The former the vital element of respiration, and the latter a narcotic poison which is largely increased in a close inhabited apartment by the expiring breath over that of the natural atmosphere.

Impure air may be powerless upon a perfectly healthy subject, while it would find a ready lodgment in the constitution affected by bad air, by lowering the tone and depressing the vital powers, thus causing predisposition to disease.

First, in order to accomplish such requirements is the warm air furnace. It is situated either in the basement or cellar with fresh air brought from without (but never from subterraneous apartments), and, after being heated, is introduced through pipes or flues to the different apartments. When properly constructed, it is cleanly and gives but little trouble in attendance. It is economical in the first cost and in consumption of fuel; and it affords at any time an abundance of warm fresh air for ventilating.

Faulty construction and gross mismanagement have occasionally brought this mode of heating into dispute. The attempt to do a large amount of heating with a small, cheap, lightly constructed furnace erected by inexperienced men which leads to overheating of the surfaces and disarrangement of the structure is the chief cause of the poor working of the warm air furnace.

The passages for the introduction of fresh air should be ample, and every precaution taken that there is no cause of impurity in the neighborhood of the supply. The point of entrance of fresh air into dwellings is a matter of importance too often neglected.

Water is used as a vehicle for heat. There are two modes of heating by hot water—direct by radiators in the various apartments, and secondly by radiators in the lower stories confined in boxes, into which outside air is introduced and conveyed by pipes to the various rooms. The warmth diffused from radiators in a room is mild and pleasant, but, when no ventilating is provided, this means becomes objectionable.

Steam has long been employed, and its use is constantly increasing for heating purposes; but, like hot water, it is expensive to install. Its chief advantage is that it can be conveyed with facility to distant points. Similar to hot water, there are two modes of conducting the heat—either by radiators in the apartment to be heated, or by a system of radiators in the lower part of the building over which outside air is introduced and so conducted to the apartments to be warmed. This is an expensive and not always a satisfactory mode unless fans or blowers are used to propel the hot air where gravity system will not operate.

The process of assembling and mounting the castings into complete stoves requires careful and skillful manipulation; and in the mounting department, the various articles receive their finishing touches, and are then ready for shipment or storage in the warehouse.

GAS STOVES.

This sketch would be incomplete without mentioning the application of both artificial and natural gas to cooking and heating apparatus. In the former instances, gas cooking stoves have to a great extent replaced the manufacture of the cheaper grades of coal stoves and ranges; and gas attachments of various patterns have been devised as adjuncts to all classes of cooking apparatus. In fact, a first-class high-grade cooing range is incomplete at the present day where gas is available without such any attachment, for it affords additional capacity when required without encroachment of floor space; and both fuels can be used severally or jointly as desired. Gas is also applied to some extent to heating stoves and furnaces.

Local historians state that in 1818, the first foundry in Troy was built, and was called the Troy Air Furnace. In 1821, Charles and Nathaniel Starbuck and Ephriam Gurley began the casting of stove plate, and, in 1823, the Eagle Furnace (afterwards known as the Rensselar) was erected by Nazro and Curtis, and succeeded by L. Stratton and Company, in 1828, and later conducted by Johnson and Geer in 1834, and Johnson, Geer and Company in 1840. It is also mentioned that in 1829 there were cast in the foundries of this city, stoves to the value of $120,000. The same authority states that in 1875, twenty-three stove establishments gave employment to over 2,000 workmen who earned that year $1,715,000; and that the value of the stoves sold was $4,000,000.

The present site of the Clinton Stove Works has been occupied since 1846 by buildings in which stoves have been made. It was purchased October 8, 1845, by Johnson and Cox, who erected the first building. They were succeeded by Johnson, Cox and Fuller, 1850; Cox, Fuller and Morrison, 1854; Fuller, Warren & Morrison, 1855; Fuller, Warren and Company, 1859; Fuller and Warren Company, Inc., 1881.

I became connected with the stove industry in 1872, and I recall some of the names of the more prominent firms manufacturing stoves in Troy at that date.

Sussey and McLeod Stove Company, Burdette, Smith and Company, Sweet, Quimby and Perry, Troy Co-operative Foundry Company, Wagar and Fales, Sheldon and Green, Hicks, Wolfe and Company, Charles Eddy and Company, Ingalls and Phillips, Torance and Merriam, Burtis and Mann, Andrew B. Fales.

To the stove manufacturers of the day, economy is of the utmost significance. Competition has brought the margin of profit so low that the cost of production must be reduced to a minimum. The constantly increasing volume of business is accompanied by an ever decreasing margin of profit; hence the manufacturer must employ every device that skill and ingenuity can suggest to make his business remunerative.

The continued business activity of late years has been the legitimate effect of creating an enormous demand for labor, resulting in an exceedingly high level for wages; and it is to be feared that the increasing prosperity has resulted in less efficiency.

And, now in conclusion, permit a word or two concerning general business conditions of the present and outlook for the future. In this country the basis of all prosperity is agriculture. Wealth comes from the soil. The prospects for both agriculture and mineral products for the present year are phenomenal. Whether the coming years will result in continued commercial activity and agricultural prosperity cannot be predicted, but so long as these essential conditions continue to exist, and business men are persuaded that our financial condition rests upon a sound basis, there should be no material break in the general prospect of business. It is not unreasonable, however, in the usual course of events, to naturally expect changes. Consequently, we should be ready to practice those timely restraints, the outgrowth of our apprehensions, which force us to take counsel of our fears even in the midst of prosperity. We must move along in confidence that the future has some privileges in store for those who merit them, with the knowledge that certain perils must be encountered, many difficult problems solved, and be not forgetful that the past events surely give confidence of progress in those things that endure longer than mere prosperity, for the standard of business ethics is higher, the relations of man to man are governed by higher principles than ever before, and we are constantly advancing into greater civilization.

PRESIDENT HUSSIE OF NATIONAL ASSOCIATION OF SHEET METAL CONTRACTORS STATES HIS VIEWS.

To AMERICAN ARTISAN:

Your recent letter, asking me to give you "my views on the warm-air furnace situation," received, and in reply will say that this question, together with the list of questions sent by you to the various furnace manufacturers (copy of which you were kind enough to enclose), opens up quite a wide field, and you will, no doubt, receive many and much varied replies. One's answer must, it seems to me, be biased somewhat by the angle from which the situation is viewed. Let me therefore first look at it from the standpoint of a retail dealer intent upon making a profit from the immediate business, without thinking too seriously of the distant future.

From this angle we in the West, at least, may obtain quite an optimistic view. Building operations are on the boom, furnaces are very largely replacing stoves in cottages that a few years since were built for stoves only. This opens up quite a large field for the enterprising furnace dealer, and I believe that the members of our association are quite generally taking advantage of the opportunity offered and are doing an increasing business.

In this class of houses moderate priced furnaces properly installed give very satisfactory results. In larger dwellings, running from fifteen to thirty rooms, I do not believe that warm-air furnace dealers are getting anywhere near

their deserved share of the business. Builders of such homes have been educated to believe that a warm-air furnace is unfit for heating such a house, and are, in many cases, unwilling to allow the warm-air furnace dealer to even demonstrate his wares.

This incorrect idea has been fostered in many ways. Without doubt the retail dealer has contributed to it to some extent—contributed by being content to accept the cheaper grade of work without an effort to obtain the better; contributed by using furnaces that were too small, or other improper installation methods; contributed by failing to do a little intelligent advertising himself or failing to back up the manufacturer in his effort to assist him. It is my firm belief,

President John H. Hussie of The National Asosciation of Sheet Metal Contractors.

however, that fully seventy-five per cent of the responsibility may be traced to the adverse advertising given the warm-air furnace through the daily press and the standard publications, by our friends who make and sell boilers. I decline to believe that improper installation of furnaces is as largely responsible as some people seem to believe, for, if this was the sole reason, it would work with equal force against hot-water heating, as it is a fact that fully as many (in proportion) inadequate and botched-up water jobs are installed as warm-air jobs.

No—it must be traced to some other cause, and the finger prints, I insist, prove my oft-repeated statement that advertising is the cause of our illness, and advertising must be used as an antidote. The National Association of Sheet Metal Contractors long since reached this conclusion, and through its Warm-Air Furnace Committee, started some years since a campaign for the purpose of securing the co-operation of furnace manufacturers. It was realized that if results were expected, an effective and fairly comprehensive organization of manufacturers was necessary.

That we have failed thus far to receive from manufacturers such co-operation as we hoped for is due, I believe, not to the fact that manufacturers as a rule do not agree with us as to the advisability of such action, but rather to the fact that manufacturers have up to this time seemingly found it impossible to form such a powerful broad gauge organization as we are tasking and hoping for.

Our Association believes that every furnace manufacturer in the United States should join and support such an organization. Many manufacturers have assured us that they heartily favor it. What then stands in the way of such an organization being formed? I can see no valid objection to it. What we need, it seems to me, is a modern Moses to lead us out of the desert in which we wander.

Our association is doing its part by urging its members to work constantly for improvement in their method of installation, for the education of architects and home owners as to the actual merit of this system of heating, and for the co-operation of the manufacturer. It is well to keep in mind, however, that thousands of dealers have unfortunately not as yet joined with our association, and that new shops are being opened daily by men who, in some cases, have but little knowledge of the heating business. A man who today is but an indifferent workman is perhaps tomorrow the proprietor of a furnace establishment. How can the furnace manufacturer reasonably expect scientific installation of his furnaces if he places the agency in palpably incompetent hands? And yet I have seen cases where a leading brand of furnaces was given to a chimney sweep for sale and installation.

Improper installation, I take it, has been fostered by four leading factors—the retail dealer, who may be careless or incompetent; the architect, who, in numberless cases, plans a house with no thought of proper heating, forcing the heating contractor to run pipes where his judgment tells him they should not be; the home owner, who frequently leaves the selection of his furnace to the general contractor, who invariably accepts the lowest bid, and the manufacturer who places an agency in manifestly incompetent hands.

Notwithstanding all this, however, I can, speaking for our association, say that we are progressing. We are increasing our business. We are improving in our methods, and we are helping each other in many ways. All of the live sheet metal contractors are not, I regret to admit, members of our association, but all of our members are good imitations of "live ones," and, as we are constantly growing, we hope to have the others soon.

Personally I have a most optimistic feeling. I believe the day is coming when the manufacturer and the dealer will be pulling together in one grand effort for the general good. Keep after us, Mr. Editor. Don't allow us to go to sleep at our post. We've got the stuff, if you can only get us to use it. A warm-air furnace is the best known method of heating a home, and it's up to us to prove it to the public.

Thanking you for what you are doing for the cause, I am, yours very truly,

JOHN H. HUSSIE.

Omaha, Nebraska.

BRIEF SUMMARY OF CONDITIONS IN WARM AIR FURNACE BUSINESS.

BY ALLEN W. WILLIAMS, COLUMBUS, OHIO.

SECRETARY MIDLAND CLUB OF FURNACE MANUFACTURERS.

Some present conditions in the warm-air furnace business might be briefly stated as follows:

FIRST—THE MAKING.

The manufacturers are, with very few exceptions, striving to make their goods better, if for no other reason than the competition which compels them to do so; besides, ex-

Allen W. Williams, Secretary, Midland Club.

perience has taught them that satisfactory furnaces are the most profitable in the end.

The cost of production has advanced during the year, with further increases indicated. The demand for furnaces is unusually heavy and all makers are busy. There is plenty of business, but the manufacturers' profits are too small to be reasonably satisfactory.

SECOND—DISTRIBUTION.

The expense of distribution is still a perplexing problem to the manufacturers, and much time and money is still spent in convincing the public of the fact that it costs more to be without a good furnace than to have one. Fortunately, the building of medium priced homes has increased and the larger use of warm-air furnaces as the best method of heating them has been brought about.

THIRD—INSTALLATION.

Nature has provided many laws which in themselves are indisputable arguments for the warm-air furnace, but the architect, manufacturer and dealer must co-operate in order to secure the fullest advantage from them. The manufacturers are more anxious and willing than ever to assist their customers in every practical, reasonable way, and the better heating contractors are availing themselves of this opportunity more and more in order to insure the best results from the warm-air furnaces which they install.

The manufacturers now realize the importance of good installation and have also learned how serious a mistake it is to place a good line in the hands of a man who knows nothing about this part of the business and cares less. Therefore, posted dealers who take an intelligent interest in their work are receiving a marked preference.

FOURTH—PROSPECTS.

Both the dealers and manufacturers have good reason to feel encouraged over the outlook, as prospects for some time to come are good. The threatened shortage of cars in which to make shipments is more serious to buyers and sellers, at present, than Presidential politics.

INTERESTING LETTER FROM DR. W. F. COLBERT, FORMERLY SECRETARY-TREASURER OF THE RECENTLY DISBANDED FEDERAL FURNACE LEAGUE.

To AMERICAN ARTISAN:

In reply to your series of questions which you submitted to men in the furnace industry, I would say:

The average annual increase in furnace sales has been

Dr. W. F. Colbert, Philadelphia.

7½ per cent. No statistics for 1912 have been compiled, but I expect 1912 to show an increase of 10 to 12 per cent over 1911.

The great furnace market is included in the following states: Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, North Dakota, South Dakota, Iowa, Missouri, Kansas, Nebraska and Colorado.

The greatest percentage increase in furnace sales is in the South Atlantic States and on the Pacific Coast.

There is probably some improvement in quality of furnace installation. Improvement is most noticeable in Middle Atlantic States, where conditions were very bad five years ago.

The retail dealers read so many descriptions of so-called good installations that nearly all of them find their own method recommended in print.

The trade journals should have an engineer on their staff or as a consultant, and should not publish a description of an installation or a recommendation of any method of installation until it has the O. K. of this competent and disinterested judge. If other articles are published, the criticism of the engineer should be published with the article.

The trade journal is the medium through which improved installation will be procured, and but little progress will be made until they inaugurate a more strict censorship than has prevailed in the past.

The better grade of furnaces do not appear to be in more demand, although showing the greater increase, however.

The particular form of bad installation in which dealers place too small a furnace to properly heat a specified area has been much decreased in the past five years. The trade journals deserve credit for incessant hammering on this point, as they have probably been the great factor in bringing about this improvement.

The manufacturers can help the retail dealers by selling furnaces of genuine merit, instead of depending on talking points of doubtful value or on competitive prices; by engineering service for regular agents; by thorough training of salesmen in practical and technical knowledge of furnace heating; by selling only to responsible dealers who are willing to follow reasonable rules for installation; by active cooperation with their responsible retail agents in every way that will increase the agent's sales in his territory.

I have but little confidence in a general publicity campaign in favor of furnace heating, unless the advertised exploits a special mark appearing only on furnaces up to a high standard of efficiency and durability, and unless these furnaces are installed under definite rules that include the various methods or systems of installation now in vogue in different sections of the United States.

For example: The advertising of "Postum" would not have been a great commercial success if the manufacturer had not told the buyer how to prepare it. Preparation of "Postum" corresponds to furnace installation.

Again: The manufacturers of russet leather found their business threatened because the leather cracked and was discolored through use of injurious polishes. They are now furnishing instructions for the care of russet leather with every pair of good tan shoes. This is a case that exactly parallels the experience of the furnace manufacturers. However, the leather manufacturers have acted promptly and vigorously, without regard to the effect of their campaign on the business of the shoe polish manufacturer, while the great majority of furnace manufacturers have either been indifferent or have cast covetous eyes on other forms of heating apparatus (which corresponds to manufacturers of russet leather turning to the manufacture of black leather).

Comparison can only be made between two furnaces. An attempt to compare the two classes would be unfair to meritorious furnaces in both classes. A properly built sheet iron radiator is about as expensive as a well built cast iron radiator. Each has certain advantages and disadvantages.

Smaller size furnaces are now being substituted for stoves to a considerable extent in the South and in southern California.

The average depreciation annually varies with the furnace, method of installation, quality of installation, usage, etc. It should be 4 or 5 per cent a year under favorable conditions.

There have been more real improvements in furnaces in 1912 than in any previous year. The tests conducted by the Federal Furnace League are directly responsible for the increase.

Steam and hot-water heating seems to be affecting the warm-air furnace business throughout the whole country. The boiler sales show an annual increase of 10 per cent, against 7½ per cent for furnaces.

The outlook for the coming year is excellent. The general business prosperity that is gradually gaining momentum offers a great opportunity for one or more progressive manufacturers of high-grade heating apparatus to establish themselves as leaders in volume of business, in profits, and in that greatest of all assets—prestige.

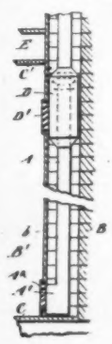
Yours very truly,

WILLIAM F. COLBERT.

Philadelphia, Pennsylvania.

APPARATUS FOR BETTER VENTILATION OF ROOMS HAS BEEN PATENTED.

United States Patent No. 1,045,835 has been granted to Merritt W. Griswold of Highwood, New Jersey,

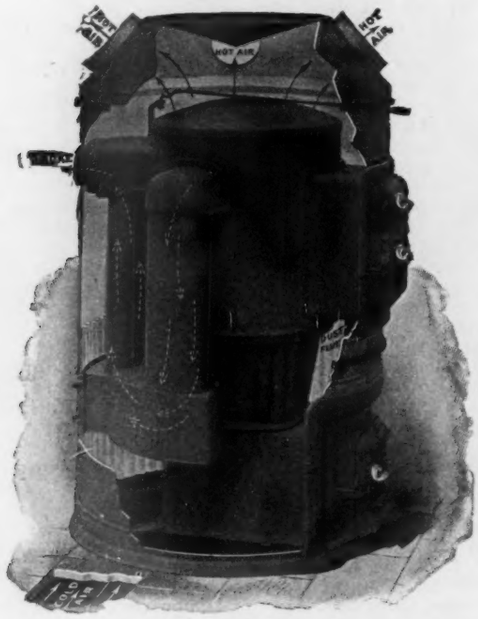


for a ventilating apparatus. In description the ventilator consists of a flue extending from the floor almost to the ceiling and having its upper end open. There is a pipe leading from the open end with a lateral opening at its lower end near the floor. A casing surrounding the pipe near the ceiling and having a lateral opening with a number of inverted funnels spaced apart and supported upon the pipe within the casing.

Some Popular Types of Furnaces and Accessories.

BOYNTON SQUARE POT FURNACES.

The Boynton Furnace Company, of Chicago, New York and Jersey City, is not only one of the oldest furnace manufacturers, but also occupy one of the most prominent positions in the furnace field of today. The company has been engaged in the manufacture



View of a Boynton Square Pot "Crusader" Furnace.

of furnaces since 1849, during which time, it is said, their furnaces have been sold in the remotest parts.

The most important feature in connection with "Boynton" furnaces is the patented square fire pot. The upper part of the fire pot is circular and the lower part is square, thus, the makers say, considerably increasing the grate area and also providing far more effective radiating surface. Furthermore, the square fire pot is corrugated, and consequently allows for even expansion in heavy firing, and reduces the possibility of a fracture to the minimum.

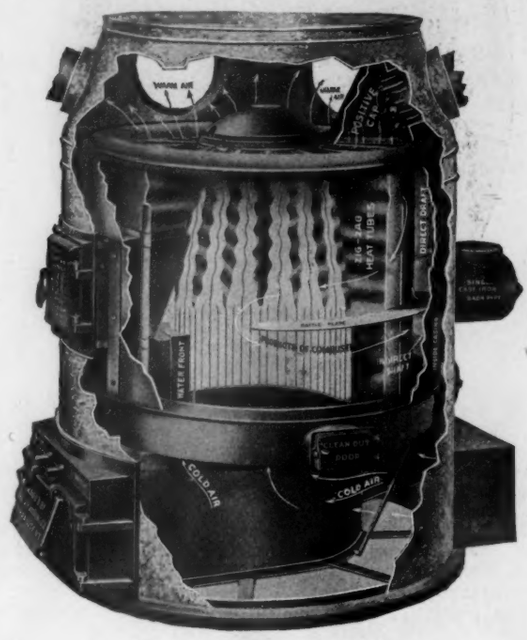
The Boynton Furnace Company install the Square Pot in their "Admiral" and "Crusader" Furnaces. considered to be their leading types. The illustration is a reproduction of the "Crusader" furnace, made with either cast iron or steel plate radiator, which the manufacturers declare to be the best type of a return flue radiator ever made.

The large ash pit, with a draw center anti-clinker grate, assuring immediate removal of ashes, and the spacious grate area, permits a perfectly clear fire. The construction of the "Crusader" furnace, it is claimed, will readily appeal to those who are looking for economy in fuel consumption. The body, with large mouth-piece, is fitted so that a coil may be inserted, and thus, it is said, will obviate the necessity of drilling the furnace at a future time, should a water-back attachment be desired for heating water for domestic purposes. The "Crusader" has a solid, cast front, and has doors mounted with bronzed hinge pins, having patented revolving grates and a dust flue which, it is asserted, will prevent all dust when cleaning grate.

THE NEW IMPROVED KELSEY WARM AIR GENERATOR.

The New Improved Kelsey Warm Air Generator is a modern and up-to-date type of furnace. It is manufactured by the Kelsey Heating Company, of Syracuse, New York. The adoption of the new improved Kelsey warm air furnace to heating all kinds of buildings is more and more demanding the attention of the discriminating purchaser, it is stated, by reason of its low initial cost, the even distribution of heat and the perfect ventilation which it provides.

The New Improved Kelsey Warm Air Generator is constructed with the patented Kelsey zig-zag heat tubes or sections. These zig-zag tubes can be plainly seen in the accompanying illustration, which represents a sectional view of this furnace. The immense amount



The Kelsey Warm Air Generator.

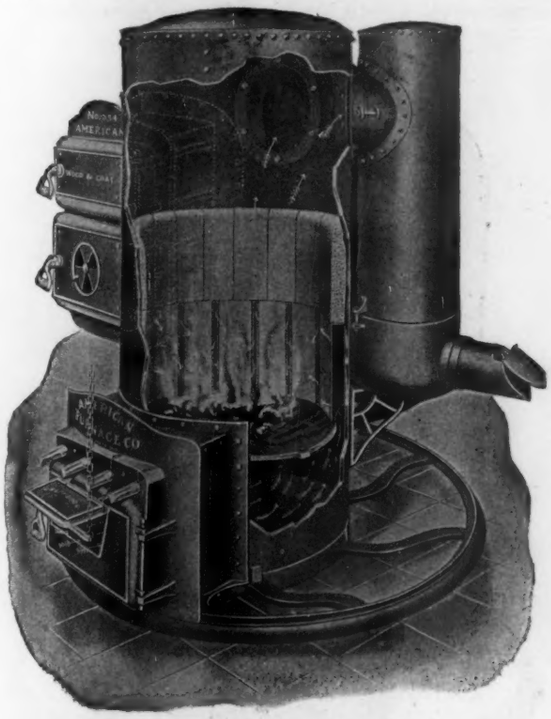
of direct radiating surface produced by these zig-zag tubes, with which it is said the fresh air must come in contact with while passing through these long corrugated sections or flues, insure the most satisfactory results.

The illustration also shows the inside and outside castings with the cold air duct and the positive cap attachment over the flues, through which it is declared the warm air is forced to the most distant and exposed

rooms. The division of the cold air into separate air currents, warmed to a moderate temperature, is claimed to cause a positive and constantly even distribution of pure warm air, which can be easily controlled.

THE "AMERICAN" FURNACE.

The "American" line of furnaces, manufactured by the American Furnace Company, of St. Louis, Missouri, is said to differ from all other types mainly on account of its new improved air blast fire-pot for consuming soft coal or slack, which it is claimed insures perfect and absolute combustion. The fire-pot is made of one piece of heavy plate steel, which forms the center drum except the head, and is lined with the best sectional fire-brick, set in a circle, to make



View of an "American" Furnace.

them self-supporting and prevent them from falling out.

This can be readily seen in the accompanying illustration, as well as the long travel of the air in passing through the furnace. The slots are ten inches high, and the American Furnace Company say that they are credited with preventing any explosions even in burning slack-coal, as the air is thoroughly mixed throughout the flames at all times. Ashes which may enter the slots have no lodgment except the bottom of the ash pit; therefore it is asserted no cleaning of the slots is required.

The grate is very strong, triangular in shape, being hollow in the center, and it is declared either side can be turned to the fire and so prevent it from warping. It is asserted that the bars work separately, thus permitting the ashes to be removed around the sides without wasting coal through the center. The joints are calked with pneumatic hammers, making the "American" furnace, it is claimed, just as free from leakage of gas as a power boiler is free from leakage of water.

THE "GILT EDGE" ALL CAST IRON FURNACE.

The following illustration shows the new Gilt Edge All Cast Iron Furnace, manufactured by the R. J. Schwab & Sons Company, Milwaukee, Wisconsin. It is said to have been designed in response to a wide demand for an economical and durable furnace to burn both hard and soft coal. The basic principles of the other Gilt Edge Furnaces have been adhered to in designing this furnace. The makers have included the same large combustion chamber—long fire travel and fully utilized radiating surface.

It is pointed out that this is a distinct improvement over many cast furnaces, for the smoke and gases are ignited before passing into the outer radiator, thus insuring no waste of fuel. The base consists of a plate or ash-pit bottom and an outer ring, which is connected to it by from four to six arms. This ring is provided with a high flange to hold the casing. The ash pit is of extra large capacity, and there is also a dust flue provided with a damper for carrying away the dust and ashes caused by shaking the furnace.

The patented anti-clinker grate is also installed in

The "Gilt Edge" All Cast Iron Furnace.

the new "Gilt Edge" Furnace, because the makers say it has proved to be the most economical and serviceable furnace grate which they have encountered in their long experience. The anti-clinker grate consists of three or four heavy cast iron bars in various sizes, which are arranged parallel to each other and connected by a lever at the front of the ash pit. One of the bars extends forward slightly to receive the shaker handle. It is said to be impossible to dump the fire into the ash pit by the ordinary shaking of the grate, but when necessary to dump the fire, it is extremely easy, for the shaker is merely turned to the extreme left.

Directly above the upper section of the fire pot of the "Gilt Edge" All Cast Furnace there is a body and feed spout which are cast in one piece. The body is from twelve to fourteen inches in height and converges from the upper section of the fire pot to the opening at the top. This form, it is said, besides absorbing and radiating the heat well, is stronger than any other possible form. An all cast radiator rests upon the top of the body, and there is but one opening from the body into the combustion chamber of the radiator. Hence, the products of combustion pass together into this combustion chamber, where they are ignited before passing through the opening leading to the outside double cylinder radiator. The dome and radiator

of this furnace are very high, compared to other furnaces manufactured on the same general principles, and it is stated that they are also larger in diameter. When desired, a galvanized casing is furnished.

THE "FRONT RANK" STEEL FURNACE.

The Haynes-Langenberg Manufacturing Company, of St. Louis, Missouri, are the makers of the well known line of "Front Rank" Furnaces. The "Front Rank" is one which is constructed on straight vertical lines. This method of construction, it is claimed, causes every particle of air in ascent to pass directly over the entire radiating surface, and the air becomes

A "Front Rank" Steel Furnace.

highly heated before being distributed through the pipes.

The vertical principle is clearly illustrated in the accompanying illustration of the "Front Rank" Furnace. The "Front Rank" Furnace is riveted like a boiler, guaranteed to be absolutely gas tight, and it is said will consume any kind of fuel. The drum is made of a solid sheet of heavy armor plate with but a single seam, and heavy cast flanges, it is said, are placed around the openings where the smoke passes from the drum into the radiator to protect the steel.

The circular shape of the drum and radiators is claimed to be an absolute safeguard against buckling. The fire pot is lined with genuine fire clay, and it is declared causes perfect combustion. The "Front Rank" Furnace has no direct draft to warp out of place and to allow the heat to escape up the chimney, and it is asserted the smoke has a very long travel inside the casting before escaping from the furnace.

The drum and radiator are self-cleaning, and the Haynes-Langenberg Manufacturing Company guarantee that the "Front Rank" will not choke up, even with the dirtiest kind of coal. The "Front Rank" is of simple construction and does not require an engineer to run it, for the makers say it is as easy to operate as a stove.

THE "HOME COMFORT" STEEL FURNACE.

The Wrought Iron Range Company, of St. Louis, Missouri, point out and call special attention to the high grade of open hearth steel plate used in the construction of their "Home Comfort" Furnaces. The cylinder of the "Home Comfort" furnace is made of a single sheet of steel, with only one seam about 15

View of a "Home Comfort" Steel Furnace.

inches in length, just above the fire door, which is subjected to the least heat.

The "Home Comfort" Furnace is entirely machine riveted under heavy pressure, thus, it is asserted, insuring absolutely gas-proof seams. The edges around all openings are protected by heavy flanges which it is asserted increase the life of the furnace. The grate bars are triangular and can be shaken individually, and when necessary can be removed or replaced instantly with very little trouble.

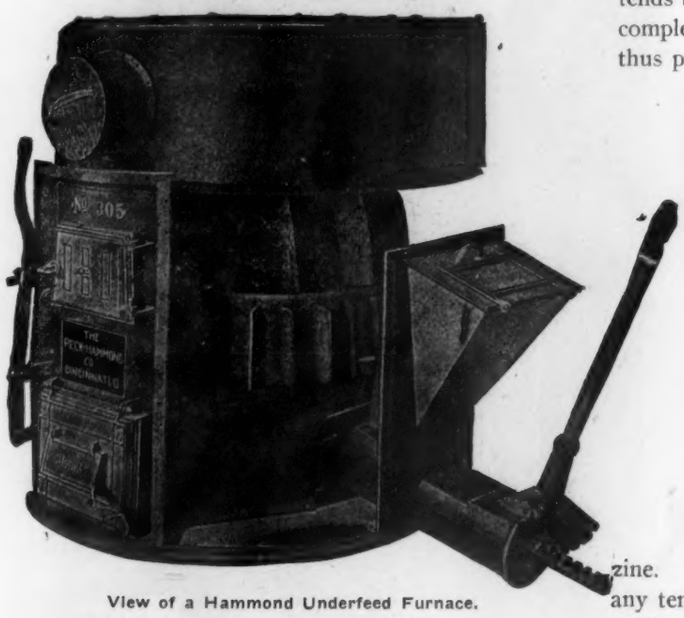
The coal door pouch extends entirely through the casing, thus, it is said, absolutely precluding the possibility of gas entering the heating chamber at this point.

The illustration of the "Home Comfort" Furnace shows the round elbow radiators, which it is claimed permit gases to reach every part of the furnace quickly and without detriment to the life of the apparatus. The combined heating surface of cylinder

and radiator is said to be enormous, and the whole is so distributed that the air supply in passing is immediately transformed into a constant, uniform flow of warm air. The relative dimensions of the fire-box and heating chamber of "Home Comfort" furnaces are based upon careful investigation, and it is declared give the maximum amount of heating capacity per pound of fuel consumed.

HAMMOND UNDERFEED FURNACE.

The Hammond Underfeed Furnace, manufactured by The Peck-Hammond Company, of Cincinnati, Ohio, is constructed with the idea of preventing the waste of fuel which passes up the chimney in the form of smoke when fresh fuel is thrown on top of the fire. The device, which the manufacturers say is not only responsible for a great saving in fuel consumption, but also in producing more radiation, is the improved "Underfeed" grate.



View of a Hammond Underfeed Furnace.

The Hammond Underfeed type of furnace is said to be far different from all other furnaces, in the feeding process, for the coal in this style of furnace is not thrown on top of the fire, as in the ordinary top feed, but is fed from beneath the fire. The Hammond Underfeed Furnace is equipped with a hopper into which the fuel is placed and from which the coal drops into the chute.

This is operated by a lever, which when pressed downwards pushes the coals through the chute of feed tube up beneath the fire. The ashes are shaken out of the grate in the same way as out of a stove, and the drafts it is declared can be regulated with the same ease as that of any other furnace.

The advantage the Peck-Hammond Company claim for this method of feeding fuel is that all the products of combustion and all gases and smoke from the fresh fuel must pass through the fire and be consumed. All that remains of the fuel, whether it be hard coal or the dirtiest kind of soft coal, is a fine ash, as it is stated all the heat producing properties of the fuel are utilized.

The radiator of the Hammond "Underfeed" furnace, which can be plainly seen in the illustration herewith, can be turned in any direction, the makers say, so as to allow the smoke collars to be turned at any angle from the front of the furnace, and permits the smoke to go direct to the flue without bends in the smoke pipe.

THE SPRAGUE UNDERFEED FURNACE.

The Sprague Foundry & Manufacturing Company, of Council Bluffs, Iowa, point to their "Underfeed" furnace as the greatest fuel economizer on the market. In this new furnace the coal is fed through the magazine or feeder that extends through from the outside of the ash pan below the grate level, delivering the fuel in the center of grate. The coal is forced through this feeder by means of a plunger, operated with a ratchet and wood lever.

The magazine is supplied with a hopper that extends up and outside the case, and this hopper opening completely closes when the plunger moves forward, thus preventing the passage of air through the magazine. This feature the manufacturers say forestalls any tendency of the coal to burn down to the feeder.

The Sprague Underfeed Furnace.

The Sprague Underfeed furnaces are made in two styles—the Sprague, with cast top radiator, and the Western, with back radiator. The Western type Underfeed furnace has a radiator directly back of the main furnace. This radiator is made with two cast heads and the shell of charcoal iron.

Two diaphragms are so arranged that the escaping gases in passing out are forced down and then up, and it is claimed in this manner the greatest amount of radiation is produced. The Sprague is an all cast furnace with a circular top radiator which the makers say is equipped with a direct and indirect draft damper, so that the gas is made to pass entirely around the radiator, instead of dividing.

THE "ALAMO" FURNACE.

The "Alamo" Furnace is manufactured by Charles Smith, of 24 West Lake Street, Chicago. It is said to combine all that is latest and best in its construction features, and is the result of the long and thorough experience of its designer, Mr. Smith, who has spent practically his entire life in the warm air furnace

industry. Particular attention, it is said, has been paid to the combustion part of the furnace, so as to secure absolutely all the heat value of the fuel. It is made on durable and heavy lines, and is said to embody all the requisites of efficiency, economy and durability which is demanded in modern and up-to-date furnaces. Besides the Alamo Furnaces, Charles Smith also makes a complete line of hot water specialties.

"FLORAL CITY KING" FURNACE.

The Monroe Foundry & Manufacturing Company, of Monroe, Michigan, assert that one of the most important reasons in accounting for the rapidly increasing sales enjoyed during their business life is because they manufacture furnaces that will consume every kind of fuel with equal success. Their furnaces have a very large fire door that will accommodate large pieces of coal or wood. Where wood is to be principally used, a special wood grate is furnished, which can be installed without disturbing the other grate.

The Floral City King Furnace.

One of the most popular styles made by the Monroe Foundry & Manufacturing Company is the "Floral City King" furnace. The accompanying illustration shows an interior view of the "Floral City King."

The "Floral City King" is a solid, extra heavy, all cast furnace, and one that with ordinary care, it is claimed, will last a lifetime. The top is corrugated and fits into a ring with a deep slot which is riveted to the top of the body and another heavy cast ring is riveted at the bottom of the body, thus, it is said, preventing any possibility of its sagging or bulging out of place.

The radiators are both heavy single piece castings, without joints, and it is claimed can be placed in any position to suit the smoke pipe. The down draft tubes connecting the top with the radiator and the radiator with the smoke outlet are of heavy steel plate, and heavy packing collars are used in connecting joints, thus, it is said, assuring perfectly gas tight and dust proof joint. The "Floral City King" is also provided with a direct draft damper which, it is declared, can be operated from the front.

THE "WEIR" FURNACE.

That the "Weir" All Steel Furnace is a furnace in which the principles of gas and soot consuming are absolutely perfected is the claim made by the Meyer Furnace Company, Peoria, Illinois, manufacturers of this line of furnaces. The accompanying illustration shows the fire-pot, which is constructed with channels so that the air introduced and heated for promoting combustion must round the entire fire-pot a number of times before it is discharged, and then in a spread-out, diffused manner over the entire fire.

The Weir All Steel Furnace.

This causes the fire to burn from the top down and from the sides to the center, and so it is stated produces immense volumes of heat and gives quick results. The Weir gas and soot consuming process is said to insure a thorough combustion of fuel into flame and heat by the ignition of volatile gases and solid matter that commonly escape in what may be called the raw condition.

The Meyer Furnace Company set forth that the products of combustion in the smallest "Weir" travel about 36 lineal feet before reaching the smoke outlet, utilizing in so passing 55 square feet of radiating sur-

face; in the largest "Weir" furnace the products of combustion have a travel of 50 lineal feet and utilize 100 square feet of radiating surface.

The "Weir" furnace is constructed from one sheet of mild low carbon boiler plate, which is said to be impervious to all gases at any temperature. The heavy dished head is inserted in this drum, and the makers say is riveted with heavy rivets, after which it is thoroughly calked to insure water and gas-tightness. The bottom of the ash-pit is of boiler plate, and it is stated is put through the same process. The feed-tube, ash-tube, extra drum or radiator, and smoke collar are all claimed to be made of the best quality of grey iron castings.

The supplementary radiator is made in two forms, the crescent shape or portable style, and the round with open center for brick setting. The manufacturers also declare that the "Weir" furnace requires no direct draft damper, and the grates are simple and easily worked. It is asserted that every piece of material used in the "Weir" is the best of its kind, and every furnace is assembled separately, insuring perfectly fitting parts throughout.

THE AJAX FURNACE.

The Ajax Furnace, shown in the accompanying illustration, is manufactured by the Co-operative Foundry Co., Rochester, New York, and 505 South Clinton Street, Chicago, Illinois. It is the latest furnace manufactured by this company, and said to be one of the most satisfactory and efficient of the low priced furnaces now on the market, having, it is claimed, more radiation and increased capacity. It is manufactured with 18, 20, 22, 24, 26 and 28-inch

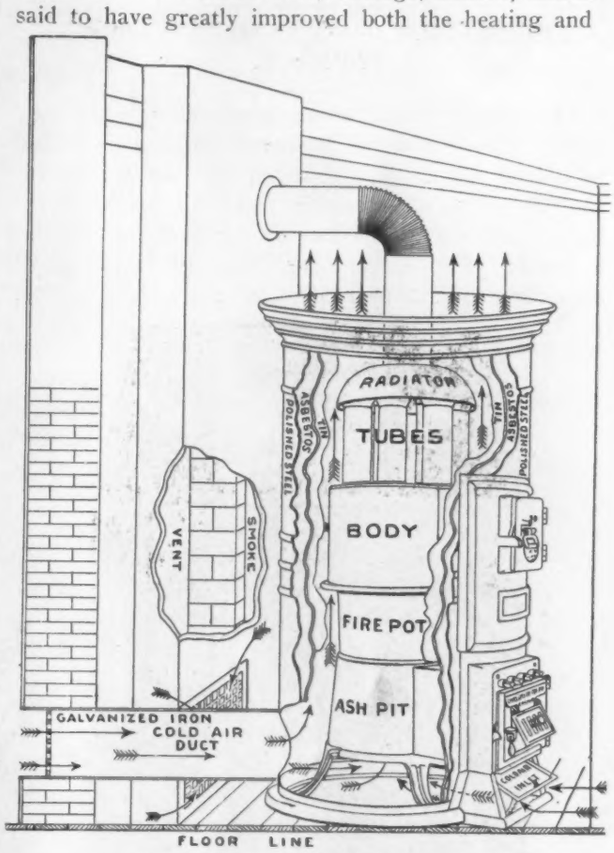
View of the Ajax Furnace.

straight firepots, and is equipped with a large double feed door, so that soft coal or wood can be burned, and there is also a large clean-out door, in order to make it easy to clean the radiator.

The latest type of the Ajax Furnace is built low down, with an enlarged casing, which, it is pointed out, guarantees an extra volume of warm air. Besides the Ajax Furnace, the Co-operative Foundry also manufacture the well known line of Bermuda and Empire Furnaces, which have experienced a great deal of success.

THE HERO VENTILATING SCHOOL ROOM HEATER.

An installation of the Hero Ventilating School Room Heater is shown in diagrammatic form below. It is manufactured by the Charles Smith Company, Lake and Dearborn Streets, Chicago, Illinois, and is said to have greatly improved both the heating and



The Hero Ventilating School Room Heater.

ventilation of schoolhouses all over the country. It consists of a cast iron furnace, having a jacket around it, which jacket, it is stated, has a tendency to make the hot air rise quickly and to prevent the heat radiating from the furnace in the face of those who sit near. There is also a vent flue to carry off all bad air and a fresh air duct to bring in pure fresh air in place of the impure air carried off through the vent flue.

The Charles Smith Company points to the fact that many school room heaters are merely jacketed stoves, but the "Hero" is really a furnace which has been designed for schoolroom work. The feed pouch extends out through the jacket, so that instead of opening two sets of doors to throw in fuel, only one feed door must be opened in the Hero Radiator. This door opens directly into the fire chamber. The heating surface is increased by the tubular construction between the firepot and top radiator. The special Hero Grate which is installed consists of four separate shaking bars, which appear to be independent of the others, so that any part of the fire may be shaken at any time. There are no cog wheels or bolts, and it is said that any pair can be replaced without disturbing the fire.

The jacket of the Hero Ventilating School Room Heater is made of planished iron, which is double lined with asbestos and sheet tin, and this jacket, by

extending clear to the floor, prevents any inside circulation of bad air and dust. The fire pot and body are made of high grade cast iron and fitted together with a deep cup joint. It is stated that installations are being made in churches, stores, lodge halls and auditoriums, besides school rooms, and that in every case satisfaction has resulted.

THE "STORM KING" AND "INVADER" FURNACE.

The "Storm King" Furnace is manufactured by the Union Stove Works, 70 Beekman Street, New York City, New York. It is provided with many modern and up-to-date construction features, which, it is stated, makes it one of the best furnaces for dealers to handle. The "Storm King" Furnace is thoroughly high class and strictly modern, is said to be a strong

View of a "Storm King" Furnace.

heat producer, and since it is provided with indirect flues is also economical in fuel consumption.

Their latest furnace is called the Invader Furnace, a new, high grade, all cast furnace, with a tubular radiator. It is stated that this new warm air furnace embodies the care and experience which the manufacturers have acquired during their seventy-six years of existence, and that it is positively the very best furnace which they have ever turned out.

One of the leading features is the design of the ash pit. When the door of the ash pit is open the grate bars are exposed, thus making their removal very easy and simple. The ash pit is made very deep and the feed door is also exceptionally large. The fire pot is made according to standard practice of two sections with allowance made for expansion and contraction.

The radiator has two clean-outs with doors. One of these clean-outs is in the front and the other in the rear. In the front of the furnace provision has been made for spuds for hot water connection. The Invader furnace is made at the present time in three different sizes. By reason of its superior points of construction, the Union Stove Works assure the trade that it is a valuable line for any dealer to handle. They will be glad to send catalogues and full particulars, upon request.

THE MONCRIEF TOP RETURN FLUE FURNACE

The Moncrief Top Return Flue Furnace, which is manufactured by the T. E. Henry Furnace Co., 825-29 Long Avenue, N. W., Cleveland, Ohio, is asserted to give satisfaction from all standpoints. The furnace is made of all cast iron and designed on extra heavy

The Moncrief Top Return Flue Furnace.

lines. The radiator of the Moncrief Furnace consists of a large combustion chamber, which rests on the flat section of the lower radiator, and this is crowned with an all cast iron return flue. The latter, it is said, makes the products of combustion travel around both sides of the top before entering the smoke pipe and keeps them within the casing walls for a sufficient time to extract all of the heat units.

The firepot is made particularly straight, this, it is pointed out, making it impossible for coal to stay on the sides. The lower parts of the firepot are more or less filled with ashes and the upper parts with the live fuel. Consequently, the firepot is made in two sections, having a cup joint in each section, so that the upper part will expand to a greater extent than the lower one.

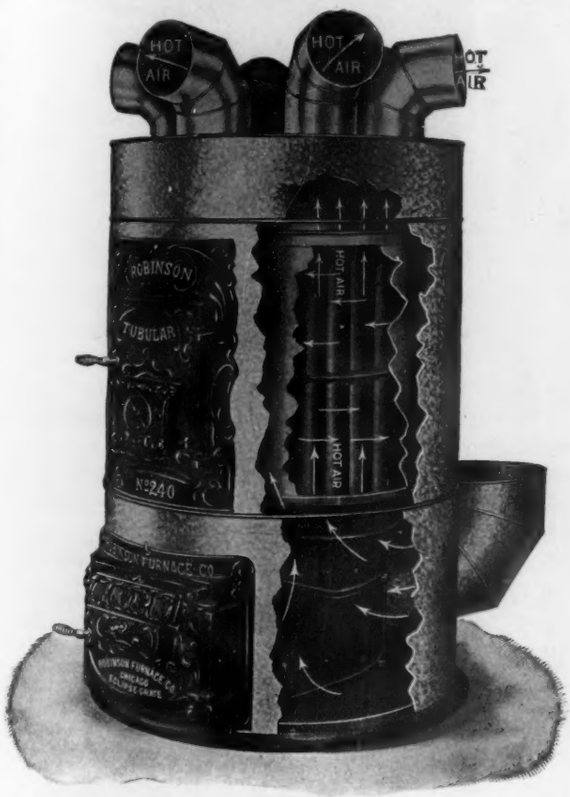
The rings are made of extra heavy iron, with lugs for double casings, and particular care is exercised to make them always of exact size. Another prominent feature of the Moncrief Furnace is the Duplex

Grate, which, it is said, reduces the labor of cleaning the firepot and makes unnecessary the use of poker or slicing bars.

THE ROBINSON TUBULAR FURNACE.

One of the most popular furnaces of the Robinson line, manufactured by the Robinson Furnace Co., 65 West Lake Street, Chicago, Illinois, is the Robinson Tubular Furnace, shown in the illustration below. The Robinson Tubular Furnace is a type which has direct draft and return flue, with a long fire travel.

Each Robinson Tubular Furnace has a direct draft damper, which when thrown down allows the smoke to enter the pipe direct. When this damper is closed, however, the smoke divides at the rear and makes two complete circuits of the radiator around the flue, before entering the smoke pipe. The ash pit is designed on



A Robinson Tubular Furnace.

broad and deep lines, allowing a good circulation of air under the grate. The dust flue with damper allows the light ashes to pass up into the combustion chamber and takes away a good bit of the annoyance commonly experienced with a dusty basement.

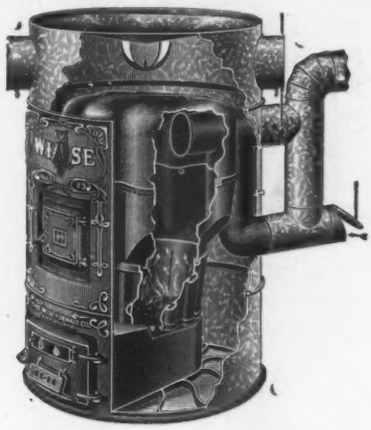
All Robinson Tubular Furnaces are supplied with the Eclipse Grate. The shaker ring is mounted on ball bearings and the ring itself slopes toward the middle and the cinders are dumped through the center. The great drum itself has three wheels mounted in it, and it is said that these wheels cannot get out of place. The furnace takes it name from the fact that it has a row of seamless boiler flues, standing close together, which form a solid wall. Around these flues the products of combustion pass on their way to the smoke pipe.

The makers point out that as nothing but air passes up the flues, they are practically indestructible. Wood grates are supplied when they are specified. These grates can be laid directly on top of the Eclipse Grates, which are a part of the regular equipment. It is stated that the Robinson Tubular Furnace has a tremendous heating surface compared with other furnaces, and will absolutely heat all of the air which passes through it.

THE "WISE" FURNACE.

The "Wise" furnace, manufactured by the Wise Furnace Company, of Akron, Ohio, shown in the accompanying illustration, is claimed to have been built on principles which are absolutely correct for insuring economical and durable results. It is said that perfect combustion has been accomplished by means of an extremely large fire surface and the admission of heated air into and over the fire for the purpose of consuming smoke and gases. The base is cast in one piece, forming the bottom of the ash pit. It also makes a support for the outside galvanized iron casing.

This casing is made very large, so as to provide space for large radiators and for the purpose of securing an adequate amount of free air space. Besides



The "Wise" Furnace.

the outer casing, there is an inner casing which prevents the heat from being radiated into the basement. These casings are furnished with either straight or canopy top.

The ash pit is very deep and is fitted to the base by means of a cup-joint, thus, it is pointed out, preventing the escape of dust into the warm air chamber. The sides are straight and the door has been made sufficiently large to allow the use of an ash pan when it is desired. The large door will also permit grates to be removed and replaced without disturbing any other part of the furnace. The flange which supports the fire pot is so made as to allow air to pass freely into the cells in the walls of the fire pot.

The fire pot which is used in the "Wise" furnace is patented, and is said to have successfully demonstrated for a number of years that it will consume lignite and all kinds of fuel very efficiently. It is made very heavy and cast in one solid piece. There are a series of cells and slots cast in the walls of the fire pot, extending from the bottom to the top, and into these cells the air is admitted and heated before entering into and above the fuel. By this method it is said fully ninety per cent of the gas and smoke is

consumed and any grade of soft coal, such as slack, screening and lignite, can be successfully burned, since all particles of fuel are subjected to the uniform draft.

The radiator is made of cast iron and has corrugations, in order to secure a large radiating surface. It is declared to be absolutely self-cleaning, as there is no place for the accumulation of soot and ashes, and it is gas and smoke proof, since there is but one joint above the fire pot, and that joint is securely packed with asbestos. The flue collar on the inside of the radiator is carried close to the center in order that the draft will not be to one side, but will be distributed uniformly around the radiator. There are several kinds of grates furnished, according to specifications, and the customer may obtain a "Wise" furnace either with the solid grate, an open shaking grate, or a triangular revolving bar grate.

THE SCHEIBLE FURNACE.

The Scheible Furnace is made by the Scheible-Moncrief Heater Co., 1444 West Ninth street, Cleveland, Ohio, the newest furnace manufacturing firm to enter the field. The manufacturers are experts in the furnace line, having had over 25 years' experience, and in the design of this furnace they have endeavored to incorporate every feature which their experience has proven is essential to an efficient and durable furnace.

The combustion chamber is of large size, and it is said that proper combustion in it may be secured with the use of any fuel. The radiator is of cast iron, the castings being solid from bottom to top, and the products of combustion pass from the center of the radiator to the outside flue. Here they divide, one-half passing around one side of the radiator and the other half around the other side. The size of the flue spaces has been given particular care in the design, to see that they are of large size and so proportioned that the draft is not retarded, and hence they are not easily clogged.

The construction of the radiator provides a large interior air passage, so that a great deal of the air which is to be warmed passes between two heating surfaces before entering the warm air tubes at the top. The casings are made extra large in diameter, so as to provide for an abundant supply of pure, warm air. The firepot is made in two pieces. Provision has been made for expansion and contraction, so that, it is declared, the firepot will absolutely not crack. The feed door is of ample size, and good, suitable space has been provided for a coil to heat water for household use, at the side of the feed door opening.

The grate is also a feature of this furnace, consisting of four triangular bars, which are so geared together that the two bars are shaken at one time. The bars are supported in front by heavy cast iron hooks. To replace them, all that is necessary is to remove the cotter pins holding the cog shield in position. Then the old bar is lifted off the hooks and replaced with the new bar. It is stated that this furnace is in a class by itself for perfection of mechanical construction, and that it gives absolute satisfaction in the providing of a sufficient quantity of healthful and pure warm air in the rooms which are to be warmed.

THE "XXTH CENTURY" FURNACE.

The accompanying illustration shows the XXth Century Furnace, manufactured by the XXth Century Heating & Ventilating Co., of Akron, Ohio. The large corrugated drum of this furnace is made of heavy plate, closely riveted, and the drum section

The XXth Century Furnace.

itself is self-cleaning. The lower sections are all made of heavy cast iron, and the furnace is said to be gas tight and dust proof. All the castings are very heavy.

There is a large feed door and a big ash pit. The combustion chamber is designed of ample size and there is a high, quick-heating radiator, which, combined with a large radiating surface and excellently designed front damper, it is stated, make an ideal, reliable and efficient heater.

It is said that there is absolutely nothing about the XXth Century Furnace which can get out of order, and the fact that it burns soft coal, lignite or wood equally well makes it very desirable to a large class of customers.

THE "PYRAMID" FURNACE.

The Forest City Foundry and Manufacturing Company, of Cleveland, Ohio, manufacture the well known line of "Pyramid" Furnaces. The "Pyramid" Furnace derives its name from the grate, which is built on the order of a pyramid, and this grate is said to be without a doubt the most important improvement in the "Pyramid" furnace.

The accompanying illustration shows the grate, when dumped for removing clinkers, etc. The grate is suported on three bearings, two of which are in the rear or back of the ash pit and the third hooks under the front of the grate frame. The rear supports are hooks, cast on the grate frame, which hook into the brackets cast on the ash pit, and so as to allow the free action on the front part of the grate without becoming unhooked in the rear.

This part consists of a center or head, to which are attached sliding bars, the construction of which will be understood from a careful inspection of the repro-

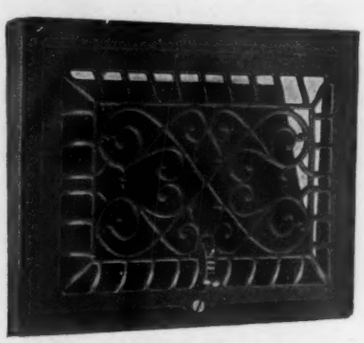
duction. The grate of the "Pyramid" furnace, it is asserted, can be entirely removed and replaced with very slight effort and in quick time, without taking any part of the furnace to pieces. The height of the "Pyramid" grate may be varied at will, from the level position to seven inches when at the highest point.

The result of this action on the fuel in the fire-pot, it is declared, is responsible for the rolling of the fire to the outside, forcing the heat directly against the side or radiating surface of the furnace; thus fresh fuel is placed in the middle, leaving the fire free to continue burning. It is stated that these features afford perfect adaptability to the cheaper grades of soft coal in the "Pyramid" furnace. These furnaces are constructed with smooth surfaces, perfectly fitting deep cup joints, and all parts are made to withstand the most intense heat, because, it is said, all parts exposed to the direct action of the heat are made extra heavy and strong.

Grate of a "Pyramid" Furnace.

WALWORTH DEFLECTING WALL REGISTER.

The Walworth Run Foundry Company, Filmore, Talcott and West 27th Streets, Cleveland, Ohio, claim that their Walworth Deflecting Wall Register can be used on a "double head." This register, it is declared, takes the place of the convex and costs less money. It takes up no room in the wall pipe, has a face or large open area, is made in standard sizes and fits regular stock sizes of fittings.

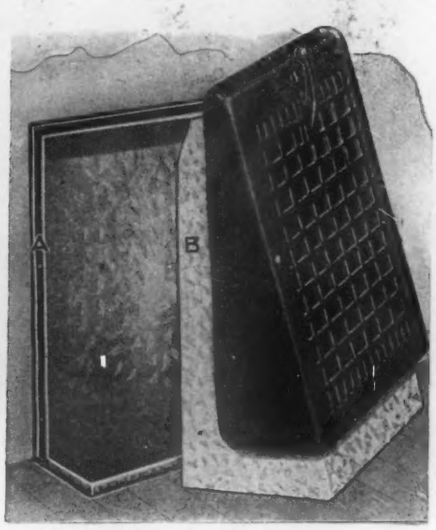


Walworth Register for Baseboard.

It is equipped with a wall frame and attached to the pipe in the same manner as the ordinary valve register. The registers of the Walworth Run Foundry Company are made in three styles, vertical, horizontal and baseboard. The company are also manufacturers of semi-steel floor registers in all sizes and finishes.

THE WATERLOO SANITARY ADJUSTABLE REGISTER HEAD.

The Waterloo Register Co., of Waterloo, Iowa, are manufacturers of a sanitary adjustable register head which is a departure from the usual structure of register heads, and they are said to embody many improvements over register heads now in the furnace supply fields. The Waterloo Adjustable Register Heads may be removed without any effort by lifting and withdrawing them from the register pipe.



The Waterloo Adjustable Sanitary Register Head, with One Register for the First Floor.

As seen in the illustration, flange *B* is attached to the register with bolts, and can be placed in position or removed at will by simply inserting flange in the opening described as *A*. No screws or bolts are required in the operation. In this manner access to the register box of the pipe is obtained when cleaning is necessary, and cleaning is often necessary if there is to be proper sanitation. Register heads fastened permanently to the wall become clogged with soot and dust particles which are readily blown about the room when a strong draft is present. However small these impurities may seem, they are very dangerous to the lungs when inhaled day after day.

The Waterloo Register Company point out that when these sanitary adjustable register heads are properly installed a perfect joint and flush are obtained with the walls, preventing the escape of warm air and avoiding the discoloration of the walls and paper near register head, which is so often the case when they are not set flush. In installing the Waterloo Register Heads a free sweep of the trowel is obtained in such a way that all open space is eliminated between register and walls. The manufacturers claim that this is the chief feature of their register. The Waterloo Register Head is made of galvanized sheet metal and is absolutely fireproof. The head is made in sections,

to conform with the various conditions that may be presented in the construction of buildings.

PADGETT HARDWOOD COLD AIR FACES.

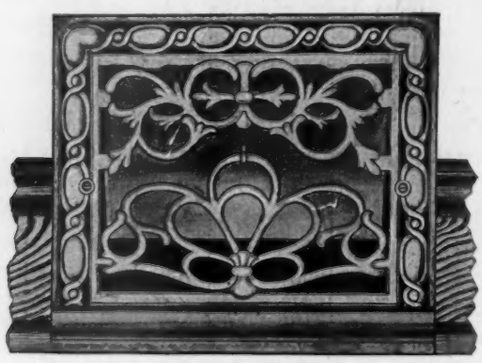
A typical Padgett Hardwood Cold Air Face, manufactured by the Wooden Ventilator Company, of East Palestine, Ohio, is shown in the accompanying illustration. These cold air faces are made to fill any space or shape desired, and the Wooden Ventilator Company will also make them of material to match

A Padgett Hardwood Cold Air Face.

any interior finish. They mark a great improvement over any previous attempts to secure adequate ventilation, because, far from detracting from the appearance of a room, they can be made to harmonize with the surroundings and look very attractive, whether used as whole seat fronts, floor faces, side-wall faces, in stair panels, cozy corners or radiator cabinets. It is claimed by the Wooden Ventilator Company that Padgett hardwood cold air faces have been now installed in an enormous number of modern buildings of all kinds. These faces were invented and originated by the Wooden Ventilator Company and are fully protected by patents.

SYMONDS REGISTERS.

The following illustration shows one of the beautiful register designs of the Symonds Register Company,



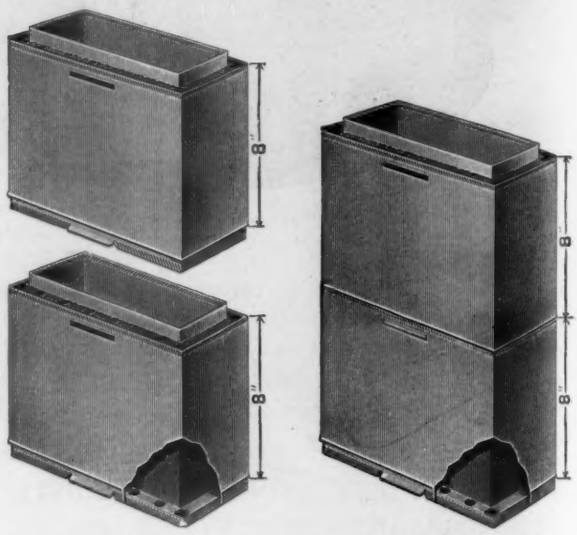
A Symonds Register.

1102-1104 Madison Street, St. Louis, Missouri. This company has aimed to combine beauty with great utility, and the large number of artistic designs in the registers which they manufacture bear witness to their efforts in this direction. Furthermore, the Symonds register can be placed in position very quickly, and consequently is asserted to be invaluable to anyone doing furnace work.

It is pointed out that the grill can be removed in an instant to allow the interior to be cleaned, and, moreover, it is not necessary to have any tools for the work, since there are no screws whatsoever to remove. The Symonds Register Company manufacture registers exclusively, and are devoting their entire time and attention to improving their registers, both in design and ease of installation.

MICHIGAN SAFETY FURNACE PIPE.

Below are given two illustrations of furnace pipe as manufactured by the Michigan Safety Furnace Pipe Company, Brooklyn and Abbott Streets, Detroit, Michigan. As shown in the cross section of the first illustration, there is an air chamber between the inner and outer pipe which is retained at all times by means of a perforated collar at each end of every piece and joint. The pipe is made in such sizes that any style of stack, long or short, straight or crooked, can be



View Showing the Furnace Pipe in Sections and When Locked.

erected without cutting a single piece or the waste of an inch of material.

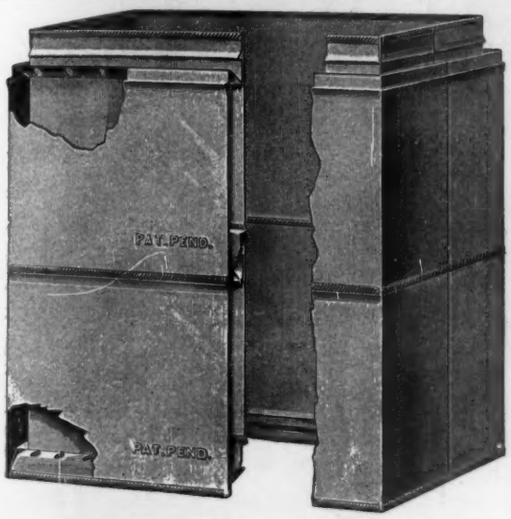
The makers further point out that every joint and piece firmly embraces and fits into the other, so that when a stack is completed it is as smooth and straight in and outside as the bore of a gun. It is made of the very best bright tin plate, without rivets or solder, by machinery especially adapted for the manufacture of this pipe.

The Michigan Safety Furnace Pipe Company assert that after twenty-five years of personal experience in putting up hot air registers they have been enabled to produce the most perfect and best sectional pipe now on the market. Almost every furnace dealer has a shop and tools for the manufacture of pipe and fittings and can make them up, but it is obvious that the cost and labor must be much greater than when made in large quantities by machinery adapted for the work.

The manufacturers feel confident that if every dealer would give their goods a trial they would be found favorable and superior in all cases of furnace installation. They want to send dealers and jobbers sample pieces of pipe.

THE EXCELSIOR DOUBLE WALL PIPE.

The Excelsior Improved Double Wall Pipe, manufactured by the Excelsior Steel Furnace Company, 513-519 West Monroe Street, Chicago, has, it is said, many points of superiority over the ordinary wall pipe now on the market. It is declared that the single tongue allows the various sections to be assembled very rapidly, and consequently reduces labor to a minimum. Again it locks automatically and permanently, and this does away with solder, and, it is asserted,



Section of Excelsior Double Wall Pipe.

effects a great saving in the cost of installation. To insure a non-collapsible pipe under all conditions, the operation is made absolute in every section.

Excelsior Improved Double Wall Pipe is made in a wide range of sizes and lengths and in any special size that may be required. It is said to comply with all the requirements of the Underwriters Laboratory, which has tested the pipe. To unlock the pipe after it is assembled, all that is necessary is to insert a case knife or two pieces of sheet iron between the sections near the corner. Besides the Double Wall Pipe, the Excelsior Steel Furnace Company manufacture a large line of heating specialties of all kinds.

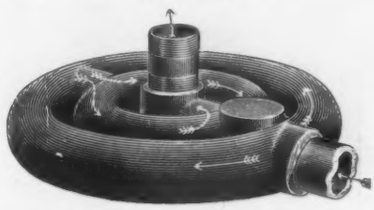
THE MAJESTIC FUEL CHUTE.

The Majestic Fuel Chute, manufactured by the Majestic Furnace Company, of Huntington, Indiana, is designed to be placed in the cellar wall of a house, exactly the same as a window, so that coal, wood or vegetables may be deposited in the cellar. The body of the chute is made of heavy steel and the door and frame of high quality cast iron, and the hopper, it is said, can be removed when desired. This hopper, which is made of heavy steel, catches all of the coal or other fuel, and when the door closes swings back into the body of the chute and allows the door to close flush with the wall. This is a most important feature, for it insures that the outside of the house is not disfigured in the slightest.

There is a self-locking device on the door to hold it open, thus escaping the side of the house when coal is being put in. There is also a gravity, self-locking catch, which can be closed and locked from the outside, but can be unlocked only from the inside, thus making it absolutely burglar proof. Another type of fuel chute, manufactured by the Majestic Furnace Co., is the "Model" Fuel Chute, which is made of rubber and glass, for the purpose of admitting ample light to the basement. When the door of this is open for use, a steel shield drops over the glass, thus protecting it from damage.

"CHAMPION" COMBINATION HOT WATER BOILERS.

"Champion" combination hot water boilers are manufactured by the Frank D. Stolz Company, 1210 Webster avenue, Chicago. A section of the boiler is shown in the accompanying illustration. One or more of these sections can be used together, according to the



Section of a "Champion" Combination Hot-Water Boiler.

amount of radiation that is available. The fire passes through spaces between the rings of each section and also over their large surface, and allows the direct action of the fire to come in contact with each section, thus making a powerful and effective heater.

Before leaving the factory it is stated the "Champion" combination hot water boilers are tested at one hundred pounds hydraulic pressure and are guaranteed by the Frank D. Stolz Company not to leak. It is said they are comparatively easy to install and that they form a most valuable line for any dealer to handle.

"HANDY" FURNACE PIPE.

A section of "Handy" furnace pipe, manufactured by F. Meyer & Brother Company, of Peoria, Illinois,

A Section of "Handy" Furnace Pipe.

is shown in the following illustration. The makers of this well known furnace pipe say there has been a most phenomenal demand for "Handy" furnace pipes and that this demand is increasing all the time, which they regard as proof of the superiority of this pipe.

"Handy" furnace pipe is made with a connecting slip which is said to be longer than that of any double wall pipe. This slip is 1⅜ inches long and is arranged so that it will fit without any effort on the part of the furnace installer, thus saving a great deal of labor.

The slip, it is pointed out, is so arranged that by means of two perpendicular sides fitting closely together an absolutely tight joint results, and this joint will not come apart under any circumstances. "Handy" furnace pipe is constructed with a large ventilating space between the inside and outside pipe, so that a current of air can pass between them from the basement to the top of register head, where it is discharged into the partition above. Besides the "Handy" furnace pipe, the F. Meyer & Brother Company manufacture and handle a complete line of other furnace supplies, and in a statement recently given out declare that their factory and equipment is being taxed to the utmost to take care of the increased sales.

"YANKEE" ALL STEEL DAMPERS AND CLIPS.

"Yankee" All Steel Dampers and Clips for stove pipe and furnace pipe are distributed by the S. M. Howes Company, 40-46 Union Street, Boston, Massachusetts. One of these dampers is shown in the accompanying illustration. It is made of No. 22 gauge steel, and is said to be absolutely unbreakable. The

A "Yankee" All-Steel Damper.

"Yankee" damper clip is said to be easily and quickly operated, and is also made of steel, having the rod and handle in a single piece. It is made of one-fourth inch steel rod, tinned.

A pin holds the washer and spring on the rod and is headed in such a manner that it cannot get out. The "Yankee" hot air damper is provided with a steel spring and washer and has a tinned steel handle, which is part of the rod. The pointed steel rod can be driven through the furnace pipe very easily. Samples will be furnished to the furnace trade, upon request, by the S. M. Howes Company.

THE K-M-C TANK HEATER.

The following illustration shows the K-M-C tank heater and laundry stove, manufactured by the Kellogg-Mackay Company, of Chicago, Illinois, Minneapolis, Minnesota, and Seattle, Washington. It is a neat, compact and convenient little heater that is said to be meeting with a great demand from all parts of the country. It occupies very little space, and the makers state that its efficiency has been proved beyond question.

From the standpoint of convenience alone, these little tank heaters have been widely approved by customers, and the Kellogg-Mackay Company point out that they are a most valuable line for any dealer to

The K-M-C Tank Heater.

handle. The construction, as may be noted from the illustration, is very simple, cast iron being employed throughout, but it has been designed to withstand plenty of hard service. Besides these tank heaters, the Kellogg-Mackay Company manufacture and handle all kinds of heating appliances and supplies, and will be glad to send a booklet describing their entire line to dealers, upon request.

TANNER & COMPANY, QUICK SHIPPERS OF FURNACE SUPPLIES.

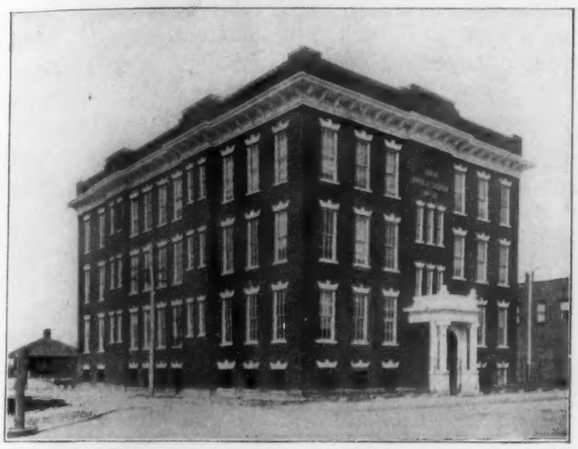
Practically everything that is needed by the furnace installer except the furnace itself is carried on hand by Tanner & Company, Indianapolis, Indiana, who are known throughout the trade as "The quick shippers." Nearly all standard lines of furnace supplies are carried there in sufficient quantities to take care of any order immediately. Among the things in stock may be mentioned steel registers, semi-steel registers, cold air faces of all kinds, double furnace wall pipe and fittings, furnace cement and stove putty, asbestos paper in several different weights, aspestos paper paste, cast steel damper clips for riveting, all steel no rivet damper clips, cast smoke pipe dampers from three to twelve inches, Yankee all steel dampers from eight to twelve inches, black steel and refined iron for inside casing, open hearth galvanized steel sheets for outside casing and many different sizes of bright coke plates for manufacturing furnace pipe. Tanner & Company are also in a position to make angles and elbows, both solid and adjustable, of all sizes up to as heavy as 20 gauge. They will be pleased to quote prices and furnish complete information to anyone, upon request.

We all have the same twenty-four hours to work with; and the man who piles up the biggest balance of achievement, or money and success, is the man who knows best how to work with this period, and how to get the most out of it. Time-economizing is more important than money-economizing, for the right use of time is the price of every earthly accomplishment and reward.—*System.*

Combination Heating Systems for School Buildings

BY R. H. BRADLEY.

The heating and ventilating of large school buildings using a combination of direct steam and warm air generators provides an apparatus that is very economical in the consumption of fuel, and one that requires only ordinary attention and care to operate.

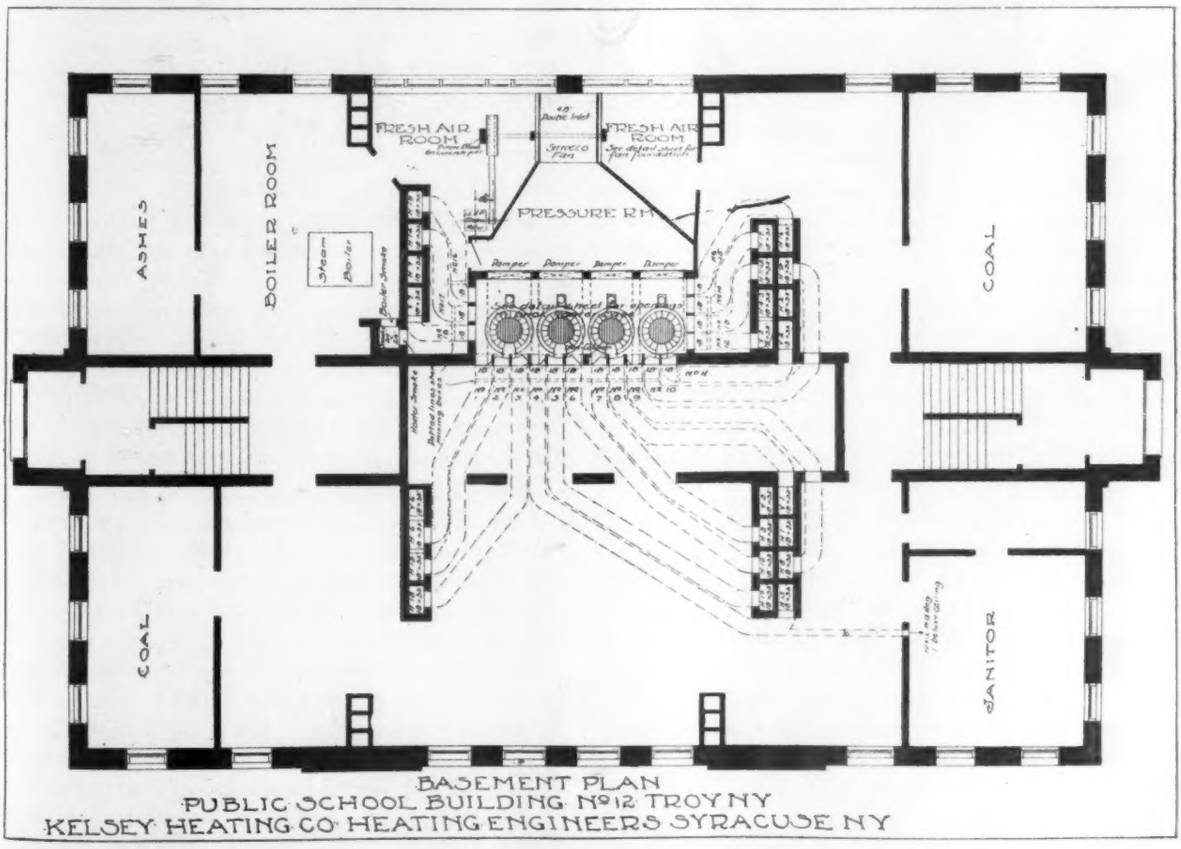


Public School Building No. 12, Troy, New York, Heated and Ventilated by Kelsey Mechanical System.

The Four Kelsey Warm Air Generators Installed in Basement.

Such an arrangement was placed by the engineering department of the Kelsey Heating Company of Syracuse, New York, through their local dealer, W. A. Sherman, in School No. 12, Troy, New York, during the year 1909.

One sectional steam boiler with a capacity of 4,500 feet of radiation was placed and connected to the 3,000 feet of direct wall radiation in the class rooms. All radiation is provided with automatic regulation which maintains the proper temperature in each room. The four Kelsey warm air generators with the largest possible amount of heating surface in proportion to the

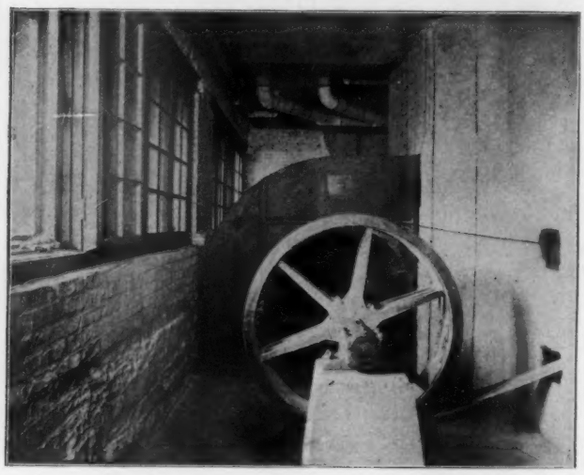


BASEMENT PLAN
PUBLIC SCHOOL BUILDING Nº12 TROY NY
KELSEY HEATING CO HEATING ENGINEERS SYRACUSE NY

grate area are placed in one brick heater chamber with 8-inch outside walls, four-inch partition walls and 4-inch roof with a secondary roof 10 inches above heater case roof for the cold air mixing chamber.

These two chambers are connected by separate mixing boxes to which the warm air ducts are attached. In each mixing box are placed dampers regulating both the supply of warm and cold air that passes into the different ducts. These dampers are provided with thermostatic control so that the proper temperature as well as the correct amount of fresh air (either warm tempered or cold) is admitted to each room.

The warm air generators were used in this building to comply with the state requirements for furnishing 30 cubic feet per pupil per minute. The air is delivered at about 85° F. at grille opening in the rooms and the heating is taken care of by the direct wall radiation, but by test it was found that in ordinary weather 24° above zero the building can be both heated and ventilated with



The Large Double Inlet Fan, Belt Driven.

the Kelsey Warm Air Generators without fire in steam boiler more economically than by using the boiler.

The velocity of the air through the grilles is 360-390 feet per minute and a total of 25,500 cubic feet of air per minute is supplied to the class rooms in this building. The warm air grilles are all placed 1 foot below the ceiling.

A No. 7 Sirocco double inlet fan was used which necessitated the large pulley shown in cut, as this size fan was specified but should have been of smaller capacity.

The power is supplied by one 12 H. P. alternating current General Electric motor. Removable cloth air filters are provided over the fresh air windows. Adjustable dampers are placed back of each Generator, which allows one or more of the heaters to be operated as required by the outside weather conditions.

A perforated steam pipe supplies the humidity in the warm air chamber. Large dampers operated from the basement are placed in each vent shaft on line with the attic floor, effectually closing off the vent openings when the building is unoccupied.

The shrewd but petty dealing that wins by tricking the other fellow doesn't pay in the end. You may catch a man off his guard once, but not a second time.—*James A. Patten.*

AN ANALYSIS OF THE FURNACE TRADE.

BY DR. W. F. COLBERT.

(A special article written by Dr. Colbert, Secretary-Treasurer and Engineer of the recently disbanded Federal Furnace League, supplementing his letter, which is published on Page 55 in this issue.)

Commercially, I find considerable demoralization as a result of hysterical efforts to cater to that class of trade that is constantly on the look-out for cheaper goods. An unfortunate feature of this tendency is the fact that the manufacturers, who know better, have the effrontery to describe these illegitimate offspring of the furnace business as "good low priced furnaces." I have had the opportunity to examine a large number of these "shadow heaters," and have yet to find one that is permanently gas tight, durable or efficient. When the patterns are made for one of these "boiler salesmen," no thought is given to any item other than cost of manufacture as modified by the single concession that the product must look somewhat like a furnace; consequently one is not surprised to find the product resembles a furnace in general appearance only.

Let us analyze this class of furnace trade.

1. By reason of the low selling price there is little or no profit in this class of business.

2. The great majority of dealers who use this class of product are poor credit risks.

3. These "shadow heaters" are installed so poorly that most of the jobs will not heat satisfactorily if a good furnace is substituted.

As furnace heating is less expensive than competing systems of heating, those who purchase "shadow heaters" from cheap contractors would still use furnace heating even though the "shadow heater" was not procurable.

What is the loss to the furnace manufacturers?

1. The difference in volume of business between the selling price of the "shadow heaters" and of substantial furnaces.

2. The loss of profit, which is greater in proportion than the loss in volume of business.

3. Inability to support an adequate service department and consequent loss of prestige through unsatisfactory service of products bearing the manufacturer's name.

4. Inability to support an adequate publicity campaign because of small profits.

5. Relative loss of increase in business as compared with steam and hot water boilers.

6. Smaller volume of business from dealers who are good credit risks.

What is the loss to furnace dealers?

1. A tremendous loss in volume of business as compared to installation of the same number of better grade furnaces (the decrease in price of installation is greater in proportion than the decrease in price of furnaces).

2. Loss of profit. (Not even the most hardened price cutter will put in a good furnace on a five to ten dollar margin of profit.)

3. Loss of the larger contracts to steamfitters because of the damaged reputation of furnace heating.

4. Loss of prestige, credit rating and scale of living

that would be theirs but for the baneful influence of the "shadow heater."

Diligent search for advantages to be obtained from the marketing of "shadow heaters" has not yielded a single item that can be set down to off-set the disadvantages to manufacturers and dealers mentioned above.

Furnace manufacturers and furnace dealers would not knowingly permit another person to rob them. How long will they continue stealing from themselves?

That some furnace dealers have awakened to the situation is demonstrated by the increased demand for larger sizes and better grades of furnaces as compared to the total furnace business for the current year. However, as the manufacturers of "shadow heaters" have shared in the increased demand for higher priced furnaces, I doubt whether the dealers who are striving to better conditions for themselves have acted wisely. The best way to rebuke manufacturers of "shadow heaters" is to place orders for good furnaces with a manufacturer who does not cater to the other class of trade.

On the part of the furnace manufacturers there is an increased interest in scientific furnace design. This interest is, of course, confined to manufacturers of higher priced furnaces, some of whom have, and some of whom are preparing to remodel their furnaces.

One of the factors that has hurt the reputation of furnace heating, even when high priced furnaces are used, is lack of air passing capacity or air space in the heater. This is shown by absolute failure to heat one or more rooms on the windward side of the building. The same weakness is shown when it is necessary to close the dampers in some heat pipes in order to induce a flow of air in one or more long pipes.

Another factor that has hurt the reputation for efficiency of many high priced furnaces (even when they have sufficient total air passing capacity) is the fact that the air space between the radiator and the casing is greater than the air space between the combustion chamber and the radiator; when for the best results the proportions should be reversed.

Again many furnaces (such as the return flue radiator type) are very poorly balanced heaters because the air delivered at one side of the bonnet is much hotter than that delivered on the other side. This results in many failures to heat the windward side of the house; not because it cannot be done, but because the cold side of the furnace happens to be set towards the cold side of the house.

We have high priced furnaces that will not "draw" unless connected to an exceptionally good chimney, simply because the flues at some point in the furnace are reduced to a smaller area than those in a good kitchen range. This defect is a hidden one in many cases and would escape the notice of anyone not well versed in the laws of friction as related to the flow of gases.

We also have high priced furnaces that have ample heating surface and yet are inefficient because the flues are of such large dimensions that the hot gases fill only a portion of the flue, the rest of the flue space and material surrounding it being practically valueless for heating purposes.

And now we come to a basic defect in any furnace —leakage of gas and dust. It is surprising to note the care with which cup joints are provided where castings, while defective joints are provided where steel and cast iron meet in radiators and where ash pit and feed door frames are mounted to their respective necks or chutes. The mounting of smoke collars, clean out collars and caps and dust flues is also poorly designed as a rule.

"Where there is a lot of smoke there must be some fire." We find a large section of the public firmly convinced that all furnaces leak dust and gas. While I am a strenuous partisan of furnace heating as it should be, I confess to the belief that the public has sufficient cause for criticism. Both furnace manufacturers and dealers have spent enough time trying to change facts by denial. If one-fourth the time that has been spent in denying that furnaces leak dust and gas, had been spent in devising and using ways to make furnaces absolutely gas and dust tight, manufacturers of competing systems of heating would long since have been deprived of their heaviest hammer. There are a few furnaces that are beyond criticism as to gas and dust tightness, but they are woefully in the minority.

Five years ago furnace manufacturers were confident that any loss of prestige of furnace heating was due to poor installation by dealers. Furnace dealers were just as confident that the manufacturers were responsible for all the ills the furnace industry was afflicted with.

The Federal Furnace League served the industry well when it started to tell both manufacturers and dealers they had to improve both furnaces and methods of installation if furnace heating was to regain lost ground. The League soon lost popularity when it tried to cure instead of palliate the ills of the industry and, as a result, died of financial starvation.

However, the work of the Federal Furnace League lives in the form of an increased number of dealers earnestly seeking a sound knowledge of heating science and in the efforts of several manufacturers to produce better furnaces than those formerly marketed.

I believe the entire furnace industry is slowly working toward the ultimate ideal—the perfect installation of the perfect Warm Air Furnace.

MANY BRANCH HOUSES OF MERCHANT & EVANS COMPANY FACILITATE DELIVERY.

Furnace men's supplies of all kinds are kept in stock by the Merchant & Evans Company of Philadelphia, Pennsylvania, with branches in other cities. To be able to make promt shipment, however, of any orders received a full supply of all kinds of furnace supplies is kept on hand at all branch houses in New York City, Baltimore, Brooklyn, Chicago, Kansas City and Denver. Included in the stock are special sizes of bright tin plates for making furnace pipes, registers, cold air faces, galvanized sheets for casings, asbestos paper and practically all kinds of furnace

accessories. The Merchant & Evans Company have issued several interesting little booklets dealing with their different kinds of stock and will be very glad to furnish complete information and quote prices to anyone upon application. Furnace men are especially invited to get in touch with the nearest branch office.

THE VENTILATION OF SCHOOL HOUSES.

A great deal of discussion has followed the publication of a recent report by a Special Committee on Ventilation of Public School Buildings, presented and adopted by the New York City Board of Education.

This report makes a synopsis of the conflicting theories that find acceptance in different quarters at the present time, shows an agreement on almost nothing except as to the enervating effect of too high temperature; but the inquiry is taken to bear enough relation to the anti-tuberculosis missionaries to warrant the publication of the report by the Rhode Island Anti-Tuberculosis Association.

A most singular lack of scientific conclusion is shown by the investigation of ventilation. "There is only one principle of ventilation upon which authorities are unanimous; namely, that a high temperature is detrimental to mental vigor and to health. Every other principle is in dispute." So runs the report. And as this is from the largest city in the country, the city that probably has erected more and costlier school buildings than any other city in the world, the authorities of smaller communities may be pardoned if they, too, lack unanimity as to how to ventilate school rooms.

It has not long been thus. In very recent times the school officer was shown a school house plan that provided the "Massachusetts rule" of ventilation, and he was ashamed to order anything different. The Massachusetts rule was a fetish. "Thirty feet of fresh, warmed air per minute per pupil, sir; that's the law," the architect assured one confidently. And, indeed, it was accepted as the last word in ventilation. A school officer who aimed at less was trifling with young lives. "Experts" began to demand more. A forced tornado of warm air became necessary—and yet no draughts. It was a problem. Yet an architect who did not approve was an old fogy; he was merely an architect and not an "engineer of heating and ventilating science." Here was another instance of the modern tendency to specialize and make a science out of a little stock of experience or supposed "know how."

It was all a very comfortable feeling of possessing the last word in these matters—for Massachusetts has an awesome reputation for progress and wisdom; and school officers and architects rested content the country over.

Builders of schoolhouses and manufacturers of heaters did not complain, for the "Massachusetts standard" added measurably to the cost of every schoolhouse as compared with structures employing direct heat and window ventilation.

From this contentment the educational and hygienic world is plunged into a condition absolutely chaotic. No planner of a schoolhouse today feels certain of any knowledge on a subject that it would seem would be absolutely basic in regard to human life and good health.

Dr. Woods Hutchinson, in a recent address before the teachers of Massachusetts, swept away almost every remnant of the ideas of school room ventilation inculcated for the past decade or two.

"Second-hand air," de-oxygenized air, carbonic acid gas, the "smelly" school room, do not threaten health—say various and varying "authorities." The situation is puzzling to the school architect and official. The New York special committee has no positive recommendations except those touching the factor of excessive temperature, but "closed systems"—which have eliminated the open window—get little indorsement.

THE TRUE CAUSES OF DANGER IN POORLY VENTILATED PLACES.

BY LEONARD HILL, M. B., F. R. S.

In answer to the recent paper of Mr. Baldwin, I will say that the title, "Impure Air Not Unhealthy if Stirred and Cooled," might give a wrong interpretation to my views, and that before criticising me, he should have taken the trouble to read through the address which I gave to the British Association. He will there find that I maintain that the dangers of ill-ventilated places arise from two causes:

(1) Infection by pathogenic bacteria, the mass influence of which is enormously increased in confined, crowded places; (2) temperature, relative moisture, uniformity and stillness, qualities of the air which profoundly influence the metabolism and health, and the immunity of the body—that is, the power to resist the invasion of pathogenic bacteria.

I also maintain therein that the chemical purity of the air in ill-ventilated rooms, so far as regards deficiency of oxygen and excess of carbonic acid gas and the chemical organic poison supposed to be exhaled by human beings, is of no importance; that attention has been wrongly directed to this instead of to the excessive temperature, relative moisture and stagnation of the air.

If Mr. Baldwin has studied the masterly research papers of Fluegge and his co-workers in Germany, also those of John Haldane in England, of Billings, Weir Mitchell and Bergey, and of Crewder in the United States, also the reports of the English Home Office on humidity in weaving sheds, he would recognize, as I do, how far behind the assured knowledge possessed by the leaders of hygienic research stands the theory and practice of the ventilating engineers; he would not fling at my head and flaunt before the public a list of authorities whose opinions only express the views which are universally accepted—that ill-ventilated air is bad in effect—but prove nothing as to the why and how.

CARBONIC ACID AND DEFICIENT OXYGEN.

The chemical impurity of the air does not matter so far as concerns oxygen and carbonic acid gas—not only when it is a slight, but a considerable variation in the percentage of these gases in the air. Overwhelming physiological evidence proves that this is so. Excess of carbon dioxide—that is, 1 per cent in the atmosphere—cannot enter the body because the

respiration is automatically regulated so as to keep the concentration of carbon dioxide in the lungs constant. The only effect of breathing an atmosphere containing this is slightly to increase the depth of the breathing, just as the breathing is deepened by the production of more carbon dioxide during exercise.

The most ill-ventilated room where discomfort is great never shows on analysis as much as 1 per cent carbon dioxide. In the famous mountain health resorts there is a far greater deficiency of oxygen owing to the attenuation of the air than ever occurs in the most ill-ventilated room. Our bodily mechanisms, such as the red coloring matter of the blood, the hæmoglobin, which, combined with oxygen, are so contrived as to keep the oxygen supply normal even at altitudes of 15,000 feet, where the air is greatly attenuated. Thus we see great cities, railways, mines, etc., built on the lofty plateaus of the Andes. It is true that people require a few days of acclimatization to such great degrees of oxygen attenuation, but it is equally true that the small diminution in the oxygen concentration which occurs at lower levels and in ill-ventilated rooms has not the least disturbing effect.

My co-workers and I have done not one, but some scores of experiments which prove that the acceleration of the heart and feelings of fatigue are entirely removed by stirring the air and bringing cooler and drier air in contact with the skin. All the discomfort of a crowded room can be dispelled by cooling the air and stirring it, without the least alteration of its chemical quality being made.

A man inside the heated, crowded room is not relieved by breathing through a tube pure air conducted to him from outside and given him at the same temperature as the room, and a man in cool air outside the said room is not made uncomfortable by breathing through a tube the vitiated air within. The effect of the warm moist air on the skin, the radiator of the body, is of paramount importance to our well-being. Warm and excessively dry (desert) air may be equally uncomfortable and of ill-effect from the excessive drying of the nose and throat and air passages. Such desert air, I understand, is introduced in winter in the American schools, which are warmed by hot-air systems, and is the common cause of throat and respiratory complaints.

CALCUTTA'S BLACK HOLE.

Mr. Baldwin mentions the Black Hole of Calcutta. The victims of this and similar disasters have died, not from suffocation, but from heat stroke. Men so crowded together in a confined space cannot keep their body temperature from rising, and the heart becomes exhausted by the febrile condition which ensues. If they survive the immediate effects they are exhausted, perhaps infected with pathogenic bacteria, and may subsequently die. In modern cities the air is confined by skyscrapers, and men live and work in dark, windless places. The chemical purity of the air therein may be good, but the darkness and windless nature of the air depresses the nervous system and is the cause of unhappiness and ill-health.

In modern battleships the men are confined in steel boxes artificially lit, where the temperature and relative moisture is often excessively high. It is these conditions which lesson the immunity and make the men susceptible to the infection by tubercle-bacilli, and infection by the organisms which produce colds, and which almost none of us escapes, but most of us can throw off. I have examined the evidence as to the existence of the chemical organic poison which is supposed to be exhaled in the breath; some of the evidence stands critical examination, and the experiments we ourselves have carried out are wholly negative. Billings, Weir Mitchell and Bergey, in their Smithsonian report, sum up the evidence on this point admirably, and reach the same conclusion.

Finally, I repeat that the question of ventilation is primarily one of keeping the temperature, relative moisture and movement of the air in proper state, so that the heat regulating mechanism of the body works without strain, and the nervous system is stimulated by pleasant cutaneous conditions, and the circulation, respiration and metabolism of the body is invigorated. To prevent the overheating of the body and discomfort of crowded rooms, the whole treatment of such rooms must be remodeled. The ventilating engineer will gain his end and the gratitude of the public not by the impulsion of warm air so as to attain high chemical purity, but by keeping the room pleasantly cool and the air in gentle motion between the bodies of the people.

PARAGRAPHS.

The Peters-Eichler Heating Co., of St. Louis, Missouri, has lately increased its capital stock from $10,000 to $25,000.

The Board of Education, of Springfield, Missouri, will call for bids on a heating plant for the proposed new high school building in that city, at a cost of $25,000.

The firm of Cook & McDonald, of Oklahoma City, Oklahoma, have been awarded the contract for heating the proposed high school building at Muskogee, Oklahoma.

The Directors of the School Board of West Pennsboro Township, Pennsylvania, have recently had installed several new heating and ventilating systems, in the different schools under their control.

Complaints have been made to the State Board of Health, of California, regarding the ventilation of the steel passenger cars of the Southern Pacific Company, claiming that the coaches are stuffy, hot and not properly aired. The Southern Pacific and Pullman Companies have promised to investigate the conditions, and if they are found to be as represented and the cars defective, to make the changes necessary to remedy same.

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R. Z. LATIMER.

Fayette, Iowa.

FACTS ABOUT ELECTRIC LIGHT PLANTS AS DEVELOPED FOR FARM USE.

BY S. E. BROWN.

"What will it cost to buy? To operate? Can I take care of it?" It is along these lines that the farmer is now asking for information on electric light plants. There is no longer any question about the desirability of electricity for farm lighting. The average farmer has passed the stage where he questions whether or not it were better that he should use it. Those whose homes justify something better than the kerosene or coal oil lamp (and whose do not?) have for some time been seeking definite facts as given in this article.

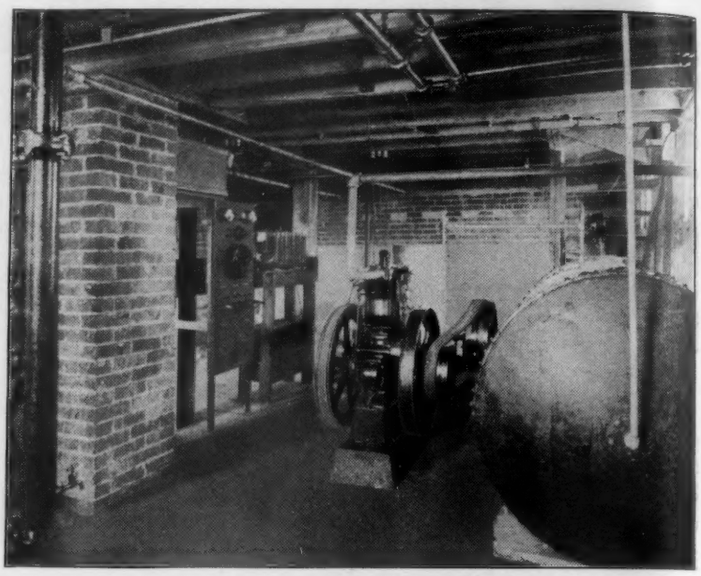
Without question, electricity is the ideal light—clear, brilliant, cleanly, healthful, and, above all, wonderfully convenient and safe. These features place it far beyond competition, if one merely looks at it from the standpoint of what he would choose were costs equal. In the cities one may practically class gas light as its only competitor, and here again the only real competition is in the matter of price. The advent of the new metallic filament lamp, known as the Mazda (or Tungsten), with its increased efficiency, clear white light and low cost for current, has made even this competition extremely close, and were it not for the fact that gas is the cheaper fuel and therefore will be brought into the house for cooking purposes, the gas jet would go. However, having gas piped in the house, the frugal house builder puts up with gas as an illumination. The oil lamp, of course, has had its day in city homes.

Such, too, is the case in the majority of the better class of farm homes. The coal oil lamp won't do. The fact that it furnishes cheap illumination is due merely to the fact that it is poor illumination. By that we mean that in the case of oil lamps one will get along with a poorly lighted room. Were enough lamps used to give what is considered good illumination, and the cost for broken chimneys, etc., figured in, it would hardly have even the argument of cheapness on its side.

But the glaring fault of oil lamps, apart from being unsafe and a constant source of labor and annoyance, is their unhealthfulness. Like charity, this item covers a multitude of sins. The evil effects of eye strain—especially atrocious in the case of children—are just being realized, and its full account charged against the lamp. Bad air is another condemning feature. The idea that the farm home is always well ventilated is a fallacy. It is closed as tightly as the city home in cold weather, and under such conditions the oil lamp or gas lamp that burns up the oxygen robs the air of its life-giving element. In the summer one has the choice of reading or working by a hot, smelly lamp or relying on the twilight, as all of us are prone to do, to our optical injury. So, when all things are charged against it, the oil lamp looms as the expensive form of illumination.

INITIAL COST OF ELECTRIC LIGHT PLANT.

Now, what about the cost of electric light? This is easiest answered by taking a concrete example and reducing it to a dollars' and cents' basis. As a case in point, we will consider the plant manufactured by Fairbanks, Morse & Co. of Chicago, which serves



Electric Light Plant and Water System Installed on Farm Near Milwaukee, Wisconsin.

especially well for a basis of calculation. They make all kinds of outfits, from 2 H. P. to 200 H. P., for any voltage or current, but the plant which this firm has standardized especially for country residences is a low voltage outfit consisting of a 2 H. P. engine, dynamo for generating current, switchboard for distributing and controlling the current from the dynamo, and a storage battery. The storage battery bears much the same relation to a dynamo as does a water tank to a pump. It stores electricity and supplies current as desired for the lights when the engine is shut down. The system includes, in addition to the foregoing, 50 improved 12-candlepower Mazda lamps, complete with fixtures. The cost of this outfit, complete, ready to run, is in the neighborhood of $500, and the only additional cost is that of wiring. The average farmer or farm boy can do this work, so that the extra cost would, in most cases, be that of wire alone. This cost, it will be seen, compares very favorably with that of an acetylene light plant, with a number of features in favor of the electric light plant that will be touched upon later.

A 50-light outfit may at first thought seem unnecessarily large, but when one begins to plan just where he should put lights, it will quickly be seen that the manufacturers have calculated carefully and well. A 6-room house, for instance, would require, say, 4 lights for the parlor, 3 for dining room, 4 for sitting room, 3 for kitchen, 1 each for bedrooms, bath and pantry, and 1 or 2 porch lights. Add to this the lights required for barn, dairy, granary and other outbuildings; places are soon found for all the lights. Of course, while all these lights will be needed at some time or other, it rarely, if ever, happens that all will be burned simultaneously, which leads naturally to

the next point, in which the prospective purchaser is deeply interested.

COST OF OPERATION.

The most efficient and therefore the least expensive method of operation is where the lights are burned direct from the dynamo, as this prevents the slight loss occasioned by use of storage batteries. Of course, where a very few lights are in use, as during the day or in the early morning, the storage battery serves a very useful purpose and really makes for economy. The costs are figured, however, for evening lighting, with the lights burning direct. Assuming, for convenience, that all 50 lights were burned at once, the figures shown are interesting. The 2 H. P. engine which furnishes the power will use about a quart of kerosene per hour, so if the lights were turned on at 5 o'clock in the evening and burned until 10 o'clock—a fair estimate for winter lighting—the actual amount of kerosene used for the evening lighting would be just a little over a gallon.

As the Fairbanks-Morse engine will run with equal facility on cheap, low-grade distillates as well as gasolene or kerosene, there are many cases where the operating expense runs to surprisingly low figures. This would be especially true where less than the full number of lamps were burned, which would ordinarily be the case in home lighting.

The 50 lights referred to above are 12-candlepower Mazda lamps, each requiring 15 watts. Fifty of them, therefore, require 750 watts, which is almost equal to the capacity of the outfit. If it is desired, stronger lights than 12 candlepower can be used, but care should be taken not to overload the machinery. For every three 16-candlepower Mazda lamps that are put on the circuit, take off four of the 12-candlepower Mazda lamps; for every three 20-candlepower Mazda lamps that are put on the circuit, take off 5 of the 12-candlepower Mazda lamps.

To make the calculation of load on the plant clear requires a little explanation of electrical terms. Electrical power is measured in kilowatts (usually abbreviated k. w.); a kilowatt is 1,000 watts. A watt is the electrical unit of work.

The watt rating of a machine is the product of the volts multiplied by the amperes. The dynamo in the particular outfit described will handle in electrical units 896 watts, or practically 9/10 k. w.

The plant will run as many lights, motors or other electrical devices as desired, provided they are all made for 30 volts and the total watt rating of all of them that are in the circuit at the same time does not exceed 896 watts. The 16-candlepower Mazda lamps each take 20 watts, and the 20-candlepower lamps 25 watts.

Electric motors, flat irons, curling irons, toasters, fans, etc., are all rated in watts, and can be obtained for 30 volts, so it is easy to figure out how many things and what size the dynamo will run at one time. For instance, if it is desired to run an electric motor that requires 280 to 300 watts, then, while it is running, there will be only 616 to 596 watts available for other work.

Besides using current from the dynamo for light and power, one will usually arrange a line shaft to be driven by the engine and use power for running the washing machine, mangle, cream separator, pump, grindstone, feed grinder, root cutter, etc. This work will usually be done during the day, and at the same time the engine can be charging the storage battery. Less than one-third the power of the engine will be required for doing the latter, hence it has easily 1¼ horsepower for additional work. This point should be considered in figuring the cost of operating a lighting system, as in the average case it would be unfair to charge the total cost against the plant as a lighting plant alone. It has been abundantly proven that a small engine on the farm pays big returns, so that one could almost subtract the engine part of the electric light plant, and charge it to general farm expenses.

Mention was made earlier in this article of the advantages of the electric as compared with the acetylene plant. It is the above mentioned feature that the acetylene plant lacks. With it one has a light plant—nothing more. While it is true that acetylene gas is now being used to a certain extent for cooking purposes, it has no advantages over electricity, as toasters, boilers, chafing dishes and a large number of other electrical devices are on the market and used in the city, where the current cost is much in excess of what obtains for the farm plant. Then the electric plant has the advantage of furnishing current for the electric fan in summer, and it makes the electrically driven washing and sewing machine a possibility for the farm wife, who has looked upon these things as unattainable as far as her home was concerned.

CARE OF OUTFIT.

To discuss this properly requires that a lighting plant be taken up in detail. First of all, we have the prime mover, consisting of a gasolene or kerosene engine. The average farmer is pretty familiar with this part of the equipment and knows that he can care for it. Next comes the electrical equipment, and here there is no need for one to hesitate. While nobody knows just exactly what electricity is, we do know how to handle and apply it, and with an outfit like this there is no danger and no difficulty in handling. The electrical generator or dynamo as now developed is as simple and reliable a piece of apparatus as can well be imagined. As one well-known manufacturer wisely puts it, "the dynamo runs better the more it is left alone." In other words, leave it alone and it does the work. As a rule these machines are entirely automatic in operation, caring for light and heavy loads without any adjustment whatever, which means that the fuel used is practically proportionate to the number of lamps burned. Directions regarding the storage battery are equally simple. "Fill the jars with distilled water once a week and do not allow to stand in a low state of charge." "Low state of charge," while it sounds mystifying, is really very simple. The state of charge is easily determined by a simple instrument which is used to determine at any time the condition of the storage cells. In short, anyone capable of handling an automobile should have no difficulty in caring for an electric light system. If anything the odds are in favor of the electric plant. Full information regarding these electric light plants will be furnished upon request by Fairbanks-Morse & Co., Chicago.

Advertising Department

All readers are invited to send in copies of advertisements in the local newspapers for criticism. All communications should be addressed to the "Advertising Department" of AMERICAN ARTISAN.

Here is a splendid ad of W. J. Pettee and Company of Oklahoma City, Oklahoma, which appeared in The Oklahoman for November 17th, and was sent in to this department for criticism. It was written by C. B. Surt, who is also the window trimmer for this company and consequently arranged a window display to correspond with the ad. Coming just before Thanksgiving, this ad of carving sets is most appropriate. The cut at the top is distinctive serving to draw immediate attention. Directly underneath is the display head "Carving Sets for Thanksgiving" which tells the reader immediately just what is the main thing advertised. There is almost too much copy in the smaller type directly under the large caption, but the ad writer has broken it somewhat by liberal use of capitals and heavy type and it is also separated in the middle by the cut of a carving set. The price is made to stand out excellently. The latter part of the ad, however, does not show up quite so well and although the principal thing in the ad is of course supposed to be the carving sets, the silverware, cut glass and other things for table service could be brought out a little better and yet not spoil the main display. The reader is advised to see the window display which is an extremely good point.

Savory Roasters
PETTEE'S
Savory Roasters
THE HARDWARE STORE
Carving Sets for Thanksgiving
Sir—Your wife will appreciate a new CARVING SET for her Thanksgiving dinner. Get HER a good set and it will please HER better than anything else, as every woman prides HERSELF on a table well set with good service as much as SHE does a good dinner. We have the CARVING SETS that are made of the very best of steel that are all quality and will stand the severest test. Then they have the beauty of design and finished workmanship that graces all occasions.
STAG CARVING SET—PRICE $10.00
Our assortment includes the season's newest and latest designs. So many different patterns to select from you will be sure to find one that suits your taste and then remember they are the very best of STEEL that will wear. Prices range from ..... $2.50 UP
SPECIAL—A GOOD CARVING SET AND CASSEROLE FOR $3.50
— SEE WINDOW DISPLAY—
Everything in table service for the Thanksgiving dinner. New, sparkling Cut Glass, Rogers 1847 Silverware Everything in Cutlery.
Savory Roasters
W. J. PETTEE & CO.
121-123 West Main
Savory Roasters
USE THE PHONE PBX 94
Supplies for the Hunter.
THE HARDWARE STORE

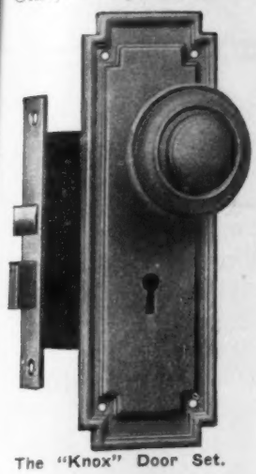
* * *

The following ad of J. A. Duffy, hardware dealer of Anderson, Indiana, appeared recently in the *Anderson Bulletin*. It is an example of what is known as a conservative ad. The dealer is advertising the stove itself, rather than the conservative features of merit, and depending upon the reputation of the "Estate Oak" stove to bring him business. Although, in this particular case, it may bring returns, as a rule it is better to emphasize the features of the stove which entitle it to notice; for instance, the "Estate Oak" display head could be made much smaller, thus leaving room for bringing out the claims as to no air leakage, perfect combustion, etc., clearly and plainly. At the present time, unless one is impressed by the stove's record in the past, the ad, in all probability, will remain unread.

Estate Oak....
With steel drum and square jointless base and NEW TUBULAR HOT BLAST ATTACHMENT.
Our claims briefly are: No air leakage, absolute control of hot blast, perfect combustion and a saving of fuel, uniform heat, a perfect base heater, durability. We do not hesitate to guarantee this stove. Let us show you.
J.A.Duffey
THE NORTH SIDE HARDWARE STORE

AN ATTRACTIVE NEW DOOR SET.

Taylor & Boggis Foundry Company, of Cleveland, Ohio, have just placed upon the market another neat and attractive design of door sets, sash lids, latch sets, plush plates, door pulls, push buttons and drop door pulls. This new design is known as the "Knox," and is made in both wrought steel and wrought bronze metal, and furnished in all of the popular finishes.

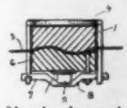


The "Knox" Door Set.

The illustration shows a "Knox" inside door set. The design is simple, but lends a highly effective appearance when installed in a door, and it is declared that it has met with instantaneous popular approval. Upon request, Taylor & Boggis Foundry Company will be very glad to mail a folder, illustrating and describing the "Knox" door sets, which gives complete information as to dimensions, finishes and prices. When writing for this folder, please mention AMERICAN ARTISAN.

A NEW WIRE FENCE CLAMP.

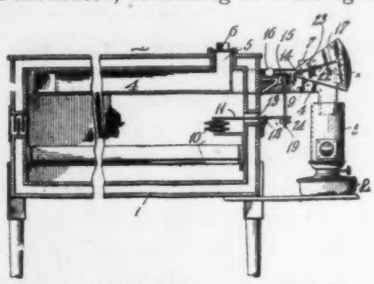
Washington M. Dillon of Sterling, Illinois, has been granted United States Patent No. 1,045,958 for a wire fence clamp. It consists of a pair of clamp members capable of being held firmly together with a number of clamp plates engaging one of the clamps and projecting beyond the other one. There are locking bars pivotally attached to the outer face of the second clamp and capable of engaging the projections of the clamp plates. The locking bars have center and outward projecting arches, and also swedges adapted to be forced beneath the arches and drawing the clamps tightly together.



A Newly Invented Wire Fence Clamp.

A NEW INCUBATOR PATENTED.

United States Patent No. 1,046,204 has been granted Christian G. Lehman of Detroit, Michigan. The patent covers incubator, consisting of a casing with an air flue extending horizontally through it. The casing is provided with an outlet through the top and a heater connected to the outer end of the air flue outside of the casing. The air flue is provided with an opening adjacent to the end on which the heater is connected.



View of the Newly Invented Incubator.

There is a damper pivoted within the air flue to swing across it and the outlet opening. A lever is connected to the damper to turn it, and is also provided with a pointer. There is a thermostat within the casing. An adjustable lever mechanism connecting the thermostat and the lever for operating the damper, and an indicator plate supported adjacent to the pointer.

MANUFACTURERS OF HORSE SHOES IN TROUBLE.

Telegraphic advices from Detroit, Michigan, state that the Federal Government filed a civil anti-trust suit there Thursday, December 12th, against the Horseshoers' "trust." In a petition in equity, Attorney General Wickersham seeks injunctions against the Master Horseshoers' National Protective Association, its officers, and manufacturers of drilled horseshoes, adjustable calks, and rubber hoof pads from continuing an alleged combination and conspiracy to confine the sale of those articles in this country and Canada to horseshoers and prevent their sale direct to horse owners. Through unlawful agreements and contracts, it is charged, the defendants have seriously interfered with interstate and foreign commerce in violation of the Sherman law.

A MACHINE FOR POLISHING RAZOR BLADES INVENTED.

John E. Drew of Jersey City, New Jersey, who is assignor to the Durham Duplex Razor Company of New York City, has been granted United States Patent No. 1,046,157 for a machine which was filed in 1910. The patent covers a razor blade polishing machine, consisting of a polishing brush, a wheel and cooperating member for supporting and presenting blades to the brush, and a wheel and a stationary guide for feeding the blades to the brush.

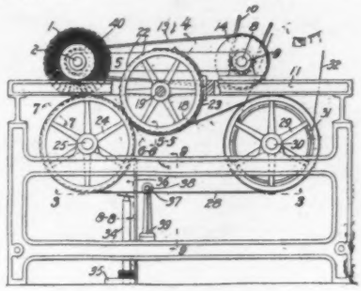


Diagram of the Machine.

SCANDINAVIAN GRANTED PATENT ON SAFETY RAZOR.

United States Patent No. 1,044,906 has been granted Johan A. Ohlsson of Stockholm, Sweden. The patent covers a safety razor comprising a blade having an edge oblique with the central longitudinal axis and a holder with a blade guard constructed with an oblique edge to conform to the blade. The blade is provided with a projecting member and the guard has a slot in which the projection can slide. In that way the blade may be held with its cutting edge nearer to or farther from the edge of the guard.

View of New Razor.

Around the World with Walter Voigt

CHINA.

The recent revolution in China, whereby the old absolute monarchy was overthrown and succeeded by a republic, is going to change the entire scheme of things in the East. Walter Voigt arrived in China on his world's tour towards the end of this revolution and saw a great many interesting things in connection with it. The Chinese as a race are infinitely superior to their cousins, the Japanese, but have been held back throughout the centuries by traditions and lack of personal liberty. Now that they have opened the way for a fuller and wider civilization by establishing a popular form of government, it is probable that some

A Moving Picture Theater in Shanghai, China.

new and startling changes will be inaugurated before very long.

Even now China is undergoing an awakening process which is nothing less than miraculous. To be sure, in every city there are the same number of dirty, sloppy streets filled with shops and stores which seem unbusinesslike and ill kept to our foreign eyes. All shops are open in the front with goods exposed to view, and men and women are seen actually working at their various trades and occupations.

Many of the streets are less than six feet wide, one principal street in Canton, China, being less than three feet in width. On the other hand, however, a great many modern customs and up-to-date things are being introduced; for instance, in the accompanying illustration is shown a moving picture place in Shanghai, China, which is said to reproduce all of the famous American and European films. These are, of course, adapted to the Chinese by having the titles in Chinese characters.

Basket chairs form the principal method of transportation through the city, one chair with four men costing $2, Mexican standard. In one of these chairs Mr. Voigt was carried along the dirty, evil smelling streets, where everything to eat, including rats and dogs, was exposed to view. On one street the King Fisher feather workers were at work. Then there were the rice paper picture painters and edible bird's nest venders.

The temples of China are wonderful, and should not be missed by any traveler. Mr. Voigt was stopped at the temple of the Five Hundred Genii by soldiers, but after a little "cunshaw," the native word for tips, had been promised, he was allowed to enter. In this temple there are five hundred gods, one of them being that of Marco Polo, the old Italian explorer, while the other gods were distributed around the place, each one apparently having a separate name and identity.

Since the beginning of the revolution, all temples are more or less guarded by soldiers, some of them being used as barracks. During Mr. Voigt's stay in Canton, one of the temples was not very well guarded, and a band of Chinese rowdies entered and destroyed some idols. It is said that many Chinese want to destroy the idols, as they do not consider them of much use, and the idols and temples, together with the accompanying priests, cost a great deal of money to maintain.

The City of the Dead lies outside of the City of Canton on a number of hills. Coolies are frequently seen carrying a dead body along one of the streets near the city wall. The city wall of Canton is eighty feet high in places. At the top of this wall is placed another wall about two feet thick. Back of this wall is a wall about eight to twelve feet wide to walk upon, and upon which cannons are placed.

The cannons which were installed were of an obsolete type and not fit to be used, but the Chinese have some very good rapid-fire guns which are planted where they will do the most good. There are holes in the top wall that slant downward, presumably so that rocks can be rolled down upon invaders. Hot lead is often poured from these slanting holes in the wall. Outside of the city wall there is a moat, similar to those around old English castles, and in this moat there is water in which lotus flowers are raised.

In the business and industrial end, China is progressing rapidly, and although many of the shops and industrial establishments are still very old-fashioned, European and in some cases American methods are being installed with great success. A traveler through China is impressed with the wonderful possibilities of the country. Labor is cheap and efficient, and it seems destined that China will one day make itself seriously regarded in the commercial world.

TINSHOP

PATTERNS FOR BRANCHING ELBOW.

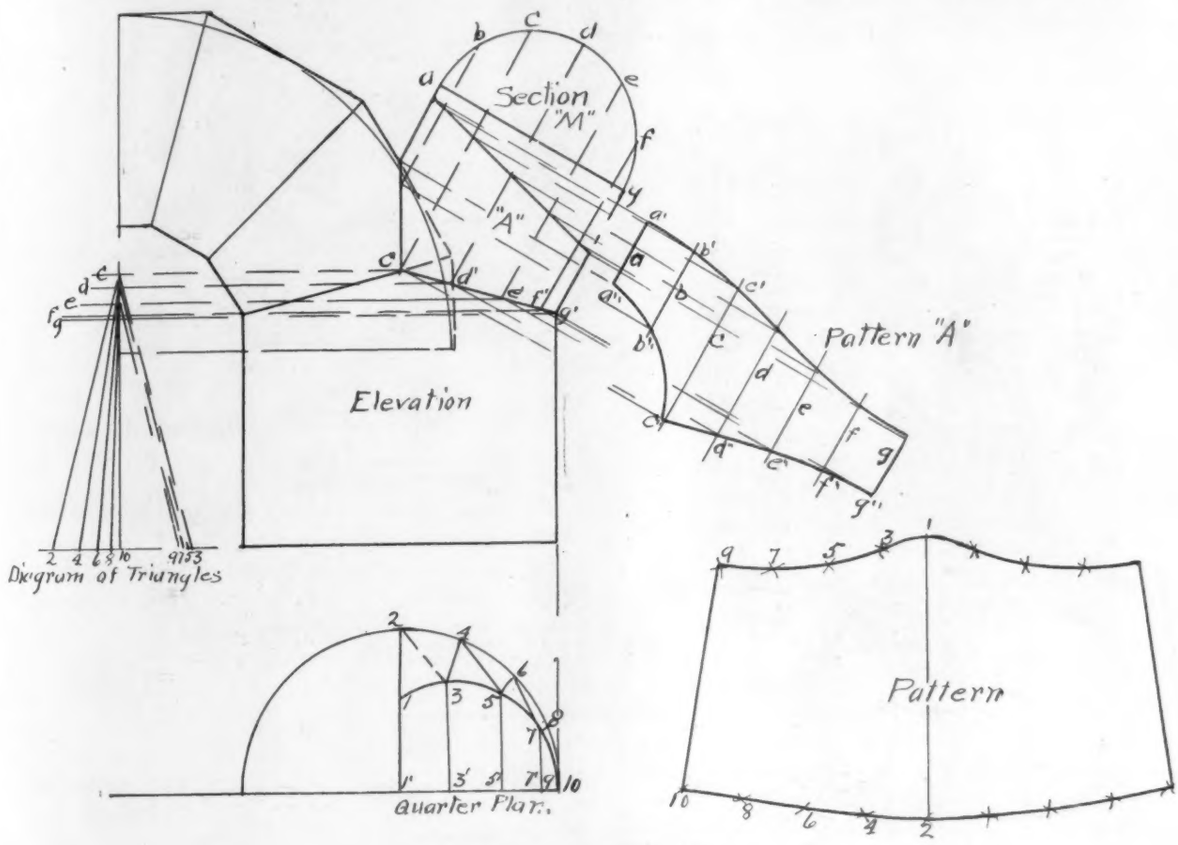
BY O. W. KOTHE.

Replying to the inquiry of Filson Brothers of Point Pleasant, West Virginia, in the November 2d issue, for this form of elbow the following can be applied to all such fittings where elbows are the same diameter. About the first thing is to draw the elevation according to the dimensions and the positions they are to be placed; thus establishing the miter lines *c'-g'* and the upper one. Describe the half section "M" and divide in any number of equal spaces, and from these points bring lines down parallel to the outlines until they intersect as at *c'-d'-e'*, etc.

A plan view is the next thing to be developed; for this describe the half circle in plan equal to the diameter of the large pipe and draw the line 1'-2. With your compasses pick the spaces from the line *a-g* from the section "M" and place them as 10-9'-7'-5', etc., in plan; from these points erect lines and make them equal in length to lines having the same position in the section "M"; then through these points trace a free hand curve and you have the plan view along the miter line in elevation.

Divide the outer quarter circle in the same number of equal spaces; number all points and draw lines in the triangular form as shown. To obtain the true length of these lines in plan construct the diagram of triangles by projecting horizontal lines from points *c'-d'-e'*, etc., in the miter line to the left indefinitely, and at any convenient point, draw the vertical line 10-*c*, and extend the lower base line a short distance as shown.

With the compasses pick the various lengths of triangular lines from plan and set them on the horizontal line over from point 10 by placing the even numbers on one side and the odd numbers on the other as shown. From these points draw lines to the various altitudinal heights as for instance 2 to *c*; 3 to *d*; 4 to *d*; 5 to *e*, etc.



Patterns for a Branching Elbow.

For the pattern draw a line equal to *c*-2 in diagram as shown by lines 1-2 in pattern. Next set your spaces equal to the space *c"-d"* from the pattern "A" and, using point 1 in pattern as center, strike arcs as at 3; then strike the arc 4 equal to the space 2-4 from plan, and with your compasses pick the line *d*-3 from diagram and, using point 2 in pattern as center, cross arcs as in point 3. Next pick the line *d*-4 from diagram and 3 as center cross arcs in point 4. Reset your compasses equal to the space *d"-e"* from the pattern "A" and, using point 3 in pattern as center, strike the arc 5.

Strike the arc 6 equal to the space 4-6 in plan; now cross these with lines *e*-5 and *e*-6 from diagram by using points 4 and 5 in pattern as center. Continue in

this manner until points 9 and 10 are established; then trace lines through all points where arcs cross; allow all extra laps for seaming or riveting and the half pattern for the transition piece is finished.

PATTERN FOR A THREE WAY Y.

To American Artisan:

In reply to query of Filson Brothers, of Point Pleasant, West Virginia, in the November 2nd issue, here is given pattern for a three way "Y," having three different sized openings.

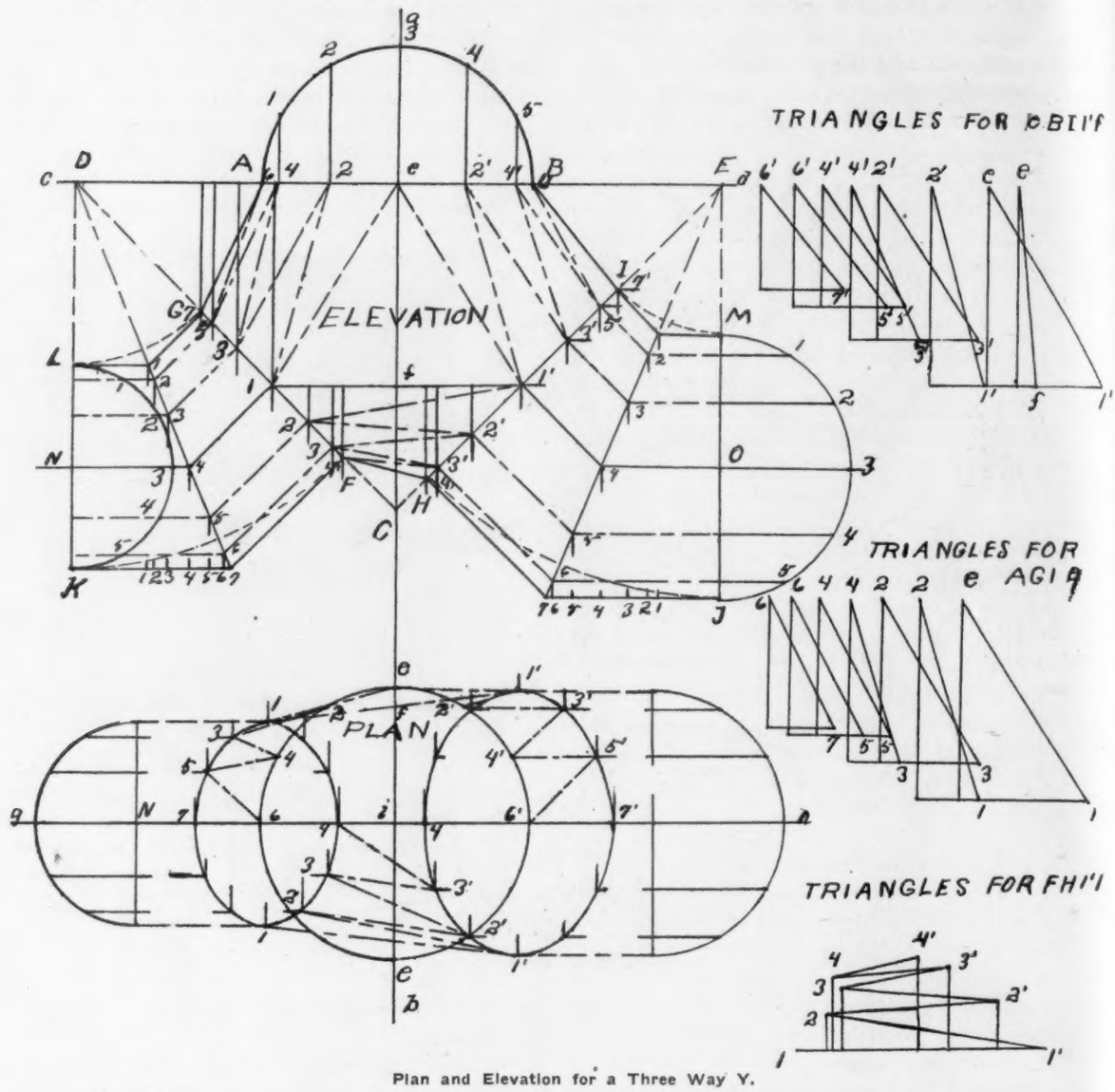
To obtain pattern, draw plan and elevation to scale desired. First draw center line *ab* and at right angles to *ab* draw line *cd*. Then with the point of intersection e as center and the desired radius *e*A describe the half section and space off equally, as shown by A12345B.

Locate C on line *ab* any distance from *e* to suit the size of outlets to be used, and from C extend lines at an angle of 45 degrees and meet line *cd* at D and E. Then on lines CD and CE locate the centers of outlets 1-1′′ an equal distance from C, and with the points 1-1′ as centers and radii equal to the size of respective outlets desired obtain outlets as shown by FG and HI. Draw lines F to H, G to A and I to B, which complete the main body of transition piece.

Now from points D, E at right angles to *cd* obtain the lines D, K and E, J. Then with D and E as centers and G, F and H, I, respectively, as radii, draw the arcs and obtain the points K L and J M. Then with N and O as centers and N L and O M as radii, obtain their respective half sections and space off as shown. Transcribe to lines F G and H I, re-respectively, and obtain points as shown by 7531234 and 7′5′3′1′2′3′4′, from which are obtained the heights of the triangles.

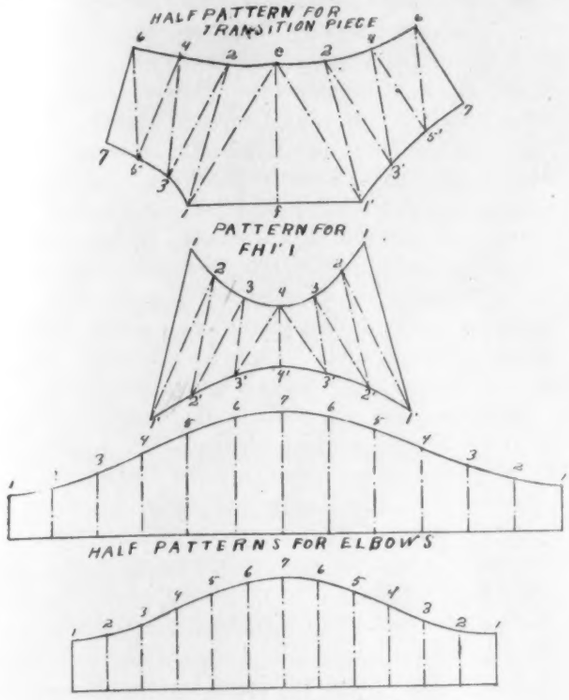
Erect lines from points G7531 and 1′3′5′7′ and intersect line *cd* and use as heights for triangles, as shown. Use similar numbered lines in plan for the base lines of triangles, then erect lines from 234 and 2′3′4′ in elevation to meet line 1-1′, and use these heights as shown in triangles for F H 1′1 and similar numbered lines in plan to be used as bases for same. The elbows for this piece are plain 45-degree elbows, so need no explanation.

In obtaining pattern for this piece the process is the same as the one in the November 30 issue of American Artisan, excepting the center triangle. The lines *e*1 and *e*1′ are of unequal lengths, so we



Plan and Elevation for a Three Way Y.

must first obtain the line *ef*, then with *e* as center and *e*1 and *e*1′ as radii and *f* as center and *f*1 and *f*″ as



Pattern for Three Way Y.

radii obtain the triangle *e*1 1′ and proceed to obtain the remainder of the triangles.

HOWARD A. LUTTS.

Elyria, Ohio, Nov. 29, 1912.

CORTRIGHT METAL SHINGLES.

The Cortright Metal Roofing Company of Philadelphia, with branch office in Chicago, claim that because they combine an attractive appearance with a protection against storm, wind, lightning and fire, the Cortright Metal Shingles which they manufacture are directly intended for the property owner who wants a good roof over his head at all times. They assert that to tinners and dealers, Cortright Metal Shingles mean a broadened field, more profits than can be made in laying other roofings, and that when each roof is laid, the owner is a means of additional advertising aids in securing new contracts with prospective buyers. The Cortright Metal Roofing Company have had selling helps, price lists and a catalogue printed, all of which will be furnished to anyone upon request. They will also furnish samples. In writing to them, please mention AMERICAN ARTISAN.

SAFEGUARDING THE EMPLOYEES OF A STEEL PLANT.

Under the above title, a very handsome booklet has been issued by the Youngstown Sheet & Tube Company of Youngstown, Ohio. It describes in detail the various rules and regulations and safety devices which have been adopted by the Youngstown Sheet & Tube Company for the prevention of accidents. Inasmuch as this company was recently awarded a medal by the International Exhibition of Hygiene, held at Dresden, Germany, for its exhibition of accident prevention signs and devices, this work should prove of interest to all employers. It is completely illustrated, showing the signs and contrivances for averting accidents, in use in the various parts of the plant, and in the accompanying description the entire plant is taken up in its various departments and each safety device is thoroughly described. The book will be sent to anyone upon request. When writing for it, please mention AMERICAN ARTISAN.

NEW ELECTRIC SOLDERING IRON.

United States Patent No. 1,045,615 has been granted to Frank A. Sandstrom of Chicago, Illinois, who is assignor of one-half interest to Frederick Benjamin, also of Chicago. The patent covers an electric soldering iron with a circuit for supplying the current.

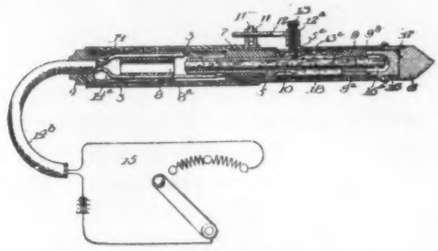


Diagram Showing Soldering Iron and Electric Circuit.

The soldering iron consists of a tubular holder with a metal terminal secured at one end. There is a head arranged on the metal terminal and insulated from it. A carbon stick is adjusted in the holder with one end projecting into the chamber of the metal terminal. The proportionate diameters of the carbon and chamber are such that a spark-gap is maintained between the end and side of the carbon and the walls of the chamber. There are batteries for supplying the arc between the carbon and the walls of the chamber.

THE ROUTH SOLDER COMPANY RESUMES OPERATIONS.

It has recently been announced that the Routh Solder Company of Newark, New Jersey, is ready to resume business on a very large scale. The company states that there is a great amount of orders on hand and they expect to find it quite difficult to cope with the situation. Moreover, the fact that tin prices are going up all the time makes the retail solder price also higher. It is stated, however, that people who are interested in soft solder will feel quite satisfied that cheap and efficient solder can be furnished by the Routh Solder Company in retail quantities, at a price below the market prices of the ordinary solder in wholesale lots.

The Routh Solder Company have established a new and unique way of sending samples. Everyone who remits the sum of $1.00 is sent an assortment of solder for every metal, including an "acid resisting solder" to be used for storage batteries. All of this solder is made from tested raw material and is asserted to be free from antimony or mercury, and the bars are molded so that in every case they have a uniform weight. Write to the Routh Solder Company for samples and information, and when writing, please mention AMERICAN ARTISAN.

A NEW KEROSENE FIRE POT.

The Ashton Manufacturing Company, of Newark, New Jersey, have just placed upon the market an addition to their well-known "Red Hot" Line of fire pots and torches. The latest fire pot uses kerosene for fuel and is styled No. 59 by the manufacturers. It is claimed that the demand for gasolene fire pots and torches is growing rapidly, but at the same time there is a demand from many customers for a kerosene fire pot which is to be used where gasolene for fire pots and torches is prohibited on account of strict insurance regulations.

A New Ashton Kerosene Fire Pot.

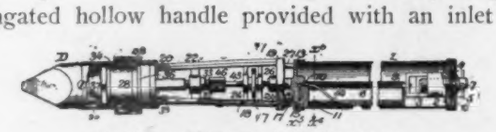
The No. 59 Ashton Kerosene Fire Pot is designed to fill this need. It is guaranteed to be first-class in every respect, and the makers say that if operated in accordance with the instructions, it will give the user splendid satisfaction. The tank is made of galvanized iron. There is a heavy cast top plate and bottom ring to protect the tank and a center support rod which runs through from the top of the tank to the base, in order to make it strong and durable.

The burner is made of special generator metal, which, it is asserted, retains the heat and works perfectly either indoors or outdoors in weather below zero, and also in windy and stormy weather. It is stated that every mechanic now in a position should avail himself of the opportunity to secure a first-class kerosene fire pot at a very moderate cost. The "Red Hot" Line of fire pots and torches is carried by all leading jobbers throughout the country, and a descriptive catalogue, showing the complete line, will be mailed by the Ashton Manufacturing Company, upon request. Write for this, and when writing, kindly mention AMERICAN ARTISAN.

NEWLY INVENTED SELF-HEATING SOLDERING IRON.

Bernhard Tropp of New York City has been granted United States Patent No. 1,045,343 for a self-heating soldering iron which he has assigned to William Henry Laird, also of New York.

The patent covers a soldering iron comprising an elongated hollow handle provided with an inlet for


Sectional View of Soldering Iron.

air and a combustible liquid. There is an outlet for the liquid, a stretched-out auxiliary reservoir for liquid, eccentrically and pivotally mounted in the chamber of the handle at its ends. One of the pivots is tubular and is connected with the liquid outlet from the chamber. The auxiliary reservoir has an inlet for liquid from the chamber in the handle, and a tube in the reservoir connected at one end with the tubular pivot and extending throughout the greater part of the length of the reservoir.

A NEW TERNE PLATE

It was quite a number of years ago that Toncan Metal, manufactured by the Stark Rolling Mill Co. of Canton, Ohio, was first introduced to the sheet metal industry as an anti-corrosive, rust-resisting sheet metal product for all exposed work.

As the ordinary galvanized steel and iron sheets had not proven sufficiently durable to withstand the usual every-day conditions of service, the manufacturers point out that in its "infancy" it was subjected to the most severe accelerated tests that could be devised, but as years rolled by, actual service tests have demonstrated it to be a product superior in durability to all but copper, and it is now a staple article of commerce, with its reputation absolutely established.

The next step was the use of Toncan Metal as a base for Terne Plates, and it is claimed that inquiries became most frequent and persitent. During this time, however, the Stark Rolling Mill Co. had been experimenting with a Toncan Metal Terne Plate, but stated that they would not market it until their own rigid ideas of what the public are contented to receive in roofing tin could be fulfilled beyond the shadow of a doubt.

Now Toncan Metal has arrived in the shape of two different plates, differing only in the coating; each said to be the acme of sheet metal perfection. The descriptions of these plates are as follows:

No. 1.—This plate is made with a base of Toncan Metal. It is asserted that by every service and accelerated test this has demonstrated, beyond the shadow of a doubt, its absolute fitness to be employed for all sheet metal uses where durability and ductility are the chief essentials, and, furthermore, Toncan Metal has proven its suitability as a base plate for the manufacture of Terne Plates, owing to the perfect amalgamation that takes place between the Toncan Metal base and the pure rich coating the company uses.

The specific nature and physical characteristics of Toncan Metal are carefully and conservatively presented in the revised textbook on corrosion, which will be sent to anyone upon request.

The coating is said to be the purest, richest and heaviest that can possibly be applied by the best of all coating methods ever devised, i. e., the old-fashioned, hand-dipped process where nothing but pure Lagos Palm Oil is used as a flux. In this method seven tinning pots are employed, and it requires the services of six persons and 35 minutes of time to complete the process, as compared with the labor of two people and 15 to 20 seconds of time required to coat a modern machine-made ordinary base plate.

The result is that, owing to this careful, slow process and the natural affiliation of Toncan Metal with the pure, rich coating employed, the plate is claimed to lift all the coating that it is possible for any sheet metal to assimilate, and it receives perfect protection at every point.

After the coating is applied by the several processes of dipping, brushing and redipping, they are cleaned by hand, and the final product is stated to be a Terne Plate combining all the durability, all the coating perfection and more ductility than was possessed by the

Terne Plates of the old English and Welsh iron masters.

No. 2.—This sheet has exactly the same base plate (Toncan Metal), the same quality of coating (oil finish), the same care of manufacture, and it has just as pure, but not so heavy a coating as the plate first described. It has, however, a heavier coating than it was customary to use on the justly famous old-time Welsh and English plates. It is redipped and cleaned, and is designed to meet the demand for a reliable, durable roofing tin at a conservative price.

It is understood that the two plates in question have not yet been named, but that there is a very likely contest on for the naming of these two new additions to the Toncan Metal family. It is reported that hundreds of suggestions for appropriate names are being received from all sections of the country and from men of all professions. The new names will be announced soon. The Toncan Metal Terne Plates are now ready for shipment—only waiting to have the name and copyrighted brand stamped on each plate in accordance with the invariable rule for identifying all Toncan Metal products. Write to the Stark Rolling Mill Co. for full information and descriptive literature, and, when writing, please mention AMERICAN ARTISAN.

VISMERA SHEETS FOR ROOFING.

As is well known, iron is attacked by many corrosive agents, and it is the impurities of iron yielding to these agents that cause corrosion and gradual decay, just as a germ will attack the weakest part of a human. The rusting of iron is a variety of corrosion. It may be prevented by giving the iron a coating of zinc to cover the pores and protect the impurities from moisture, or, in other words, it may be galvanized or it may be coated with copper. It has been discovered that manganese alloyed with iron will throw off many impurities, such as sulphur and silicon, and form a ferrous compound of increased density and hardness.

This is the principle employed in Vismera Sheets, made by the Inland Steel Company, with works at Indiana Harbor, Indiana, and offices in Chicago and the principal cities. Vismera Sheets, it is said, are made of iron scientifically alloyed with manganese and copper. The copper comes to the surface in the rolling process and give the sheets a covering.

The makers claim that Vismera Sheets are made of almost chemically pure iron, and, on account of the resulting non-corrosive and rust-resisting qualities, they are particularly well adapted for factory and shop roofings because they can withstand the elements from without and the fumes from within.

Samples of Vismera Sheets will be sent by the Inland Steel Company to anyone for analysis. They do not ask buyers to accept their factory analysis without additional proof. The company is in possession of many testimonials from satisfied users of Vismera Sheets and have complete literature which will be furnished to anyone upon request. Write for it, and, when writing, please mention AMERICAN ARTISAN.

MAKING AN ALLOY.

Plating one metal with another is a surface matter, like the French veneer in furniture. An alloy goes deeper, and is a mixture or compound of two or more metals. An amalgam is any metallic mixture or alloy, of which mercury is the chief constituent. This mixing of metals is sometimes followed by surprising results. The compound may have properties found in none of its constituents.

The English penny is commonly known as a "copper." But this metal in a pure state would be too soft for the wear which a coin has to undergo. To harden the copper a different metal—about 5 per cent—is added to the pure metal. This percentage is mostly tin. The curious result is that, while tin itself is quite a soft metal, yet the addition of 5 per cent of it to pure copper produces an alloy which is much harder than either.

In like manner pure gold and silver are too soft to be used for coins or for ornaments. They are hardened usually by the addition of copper. The silver coin of England has 7½ per cent of copper in it, though its color does not betray the presence of the alloy. The English gold coin is also alloyed with copper to the extent of one part for every eleven parts of gold. Such an alloy is called 22-carat gold, because out of 24 parts of the alloy 22 parts are pure gold. Ordinary alloys contain less of the precious metal, and so are described as 18 or 12 or 9-carat gold, these figures indicating that 24 parts of the alloy contain 18 or 12 or 9 parts of the pure gold, respectively.

Another property which is changed by adding a second metal is that of melting or fusibility. An alloy as a rule melts at a much lower temperature than do its constituent metals. Common solder is a case in point. This process consists in joining two metals by an alloy which is more easily melted than either, and which at the same time will coalesce with each metal. Tin and lead is the mixture which forms the ordinary solder of the plumber. Tin melts at 440 degrees F. and lead at 617 degrees. But the mixture or solder itself melts at 374 degrees. The lowering of the melting point is far greater when several metals are combined. Lead, tin, bismuth and cadmium melt at 617, 440, 514 and 608 degrees, respectively, and yet when mixed in certain proportions they produce an alloy which melts in hot water, and is hence known as "fusible metal."

Inventive genius has been quick to turn to good advantage the fact that certain alloys are easily melted, as, for example, in the construction of fire alarms. A quantity of fusible metal is arranged in a receptacle in such a way that when a certain temperature has been exceeded the alloy melts, releasing a spring or allowing a lever to fall. By this device an electric circuit is closed and an alarm bell is sounded.

Sprinklers which are fitted up in factories and workshops, designed to play automatically upon the earliest blaze, depend upon the same fusible alloys. Water pipes are led round the upper part of a room, and at intervals on the pipes there are valves closed by a fusible alloy. If a fire breaks out in such a room, the slight rise in temperature occasioned by the first

blaze will be enough to melt the fusible alloy at one or more of the valves, the water will stream forth, and possibly extinguish the flames at once. Such has often proved to be the case.

PATTERN WANTED FOR COMPOUND TRANSITIONAL ELBOW.

To AMERICAN ARTISAN:

I would like to have shown to me the development of a pattern for a compound transitional elbow from rectangle to round. O. E. S.

Beloit, Wisconsin.

NOTES AND QUERIES.

INQUIRY FOR ADDRESS.

From Carl E. Gschwind, The Gschwind Furnace Company, 24 North Walnut Street, Youngstown, Ohio.

Will you kindly give us the address of Giblin & Company, as we are in need of repairs for their furnace?

Ans.—Giblin & Company, Utica, New York.

WHITE ENAMELED STEEL COVERS.

From J. H. Cundiff, Danville, Illinois.

Can you give me the name of a firm making white enameled steel covers for kitchen tables?

Ans. White Enamel Refrigerator Company, 1340 University Avenue, St. Paul, Minnesota.

REPAIRS FOR FIRELIGHT NO. 12 STOVE.

From F. M. Gilley, 21 John Street, Chelsea, Massachusetts.

Will you kindly tell me where I can get repairs for the open grate stove called the Firelight No. 12?

Ans. Orr Painter Company, Reading, Pennsylvania; C. Embrich & Company, 371 South High Street, Columbus, Ohio.

CAN SOLDERING MACHINES.

From Follansbee Brothers Company, Pittsburgh, Pennsylvania.

Kindly advise us where we can secure Can Soldering Machines.

Ans. Allbright Mell Company, 4019 Wentworth Avenue, Chicago; Torris, Wold & Company, 218 North Jefferson Street, Chicago.

IRON MALLEABLE CASTINGS.

From T. L. Conroy, McLean, Illinois.

Would you advise me where I can obtain malleable castings, and oblige?

Ans. Illinois Malleable Iron Co., Chicago, Illinois; Missouri Malleable Iron Co., East St. Louis, Illinois.

DROP FORGINGS.

From T. L. Conroy, McLean, Illinois.

Can you tell me where I can get drop forgings?

Ans. Van Doren Mfg. Company, Chicago Heights, Illinois.

NAILS FOR SHEET METAL WORK.

From E. R. Probert, 606 Garrard Street, Covington, Kentucky.

Can you give me the name and address of a concern which manufactures large headed nails, called clinch nails, which are used for fastening corrugated iron to structural iron work? I wish to get nails of different lengths which will easily bend.

Ans.—American Steel & Wire Company, Chicago, Illinois.

GALVANIZED SHEETS.

From T. L. Conroy, McLean, Illinois.

Where can I obtain galvanized sheets?

Ans. Wheeling Corrugating Company, Wheeling, West Virginia; Stark Rolling Mills Co., Canton, Ohio; American Rolling Mill Co., Middletown, Ohio; American Sheet & Tin Plate Co., Pittsburgh, Pa.; Berger Mfg. Co., Canton, Ohio; Youngstown Sheet & Tube Co., Youngstown, Ohio.

ITEMS.

The Interstate Metal Cornice Co. of Jersey City, New Jersey, tinsmiths, has been incorporated, with a capital stock of $10,000. The incorporators are Isaac Nesselowitz, Hyman Eckstein and Ida Nesselowitz.

Swanda Brothers, metal ceiling and cornice manufacturers and contractors, of Oklahoma City, Oklahoma, were recently awarded the contract for furnishing the metal ceiling and cornice for a large church and two store room buildings, to be built at Bishop, Texas.

The West Coast Roofing & Mfg. Co. of Chicago, Illinois, has just been incorporated, with a capital stock of $2,000, to manufacture and deal in building material, machinery, roofing material, etc. The incorporators are Mark D. Goodman, David McIntee and Walter H. Hermsdorff.

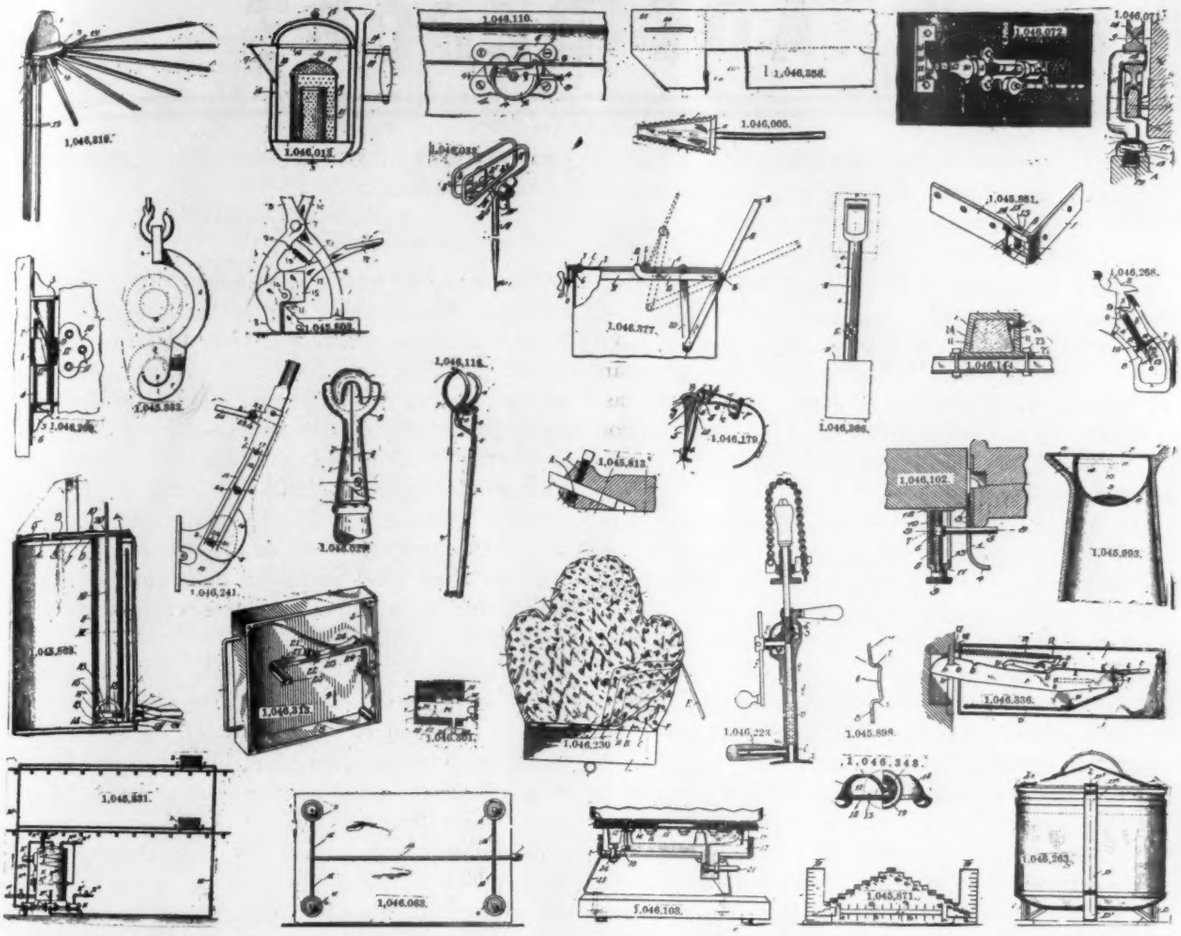
The J. I. McCoy & Son Co., of Columbus, Ohio, have just been incorporated to manufacture and deal in furnaces, metal and composition roofing, etc., with a capitalization of $15,000, consisting of 150 shares of $100 each. The incorporators are: J. L. McCoy, A. C. McCoy, F. B. McCoy, Thomas Lewis and H. Miller.

It is reported that the material for the buildings at the new plant of the Wheeling Sheet & Tin Plate Co., a few miles north of Martins Ferry, West Virginia, is now on the ground and the work of construction will be pushed rapidly. The foundation work has been completed. It is understood that it will take at least a month to put up the buildings.

President I. M. Scott of the La Belle Iron Works, Steubenville, Ohio, recently tendered his resignation, to take effect at the option of the directors. It is understood that he will become the president of the newly organized Wheeling Sheet & Tin Plate Co., of which he is the largest stockholder. The latter company is now building a plant at Tiltonville, Ohio.

The Youngstown Sheet & Tube Co., of Youngstown, Ohio, are planning some extensive improvements and changes at their East Youngstown Works. A new channel will be constructed for the Mahoning river, and this will afford some 80 acres of available manufacturing land. It is rumored that bar and structural mills will be erected on this redeemed land, and that, providing a deal can be made, the company will acquire the old bridge works property in Haselton, which would give them a plant nearly three miles in length and provide land for a number of additional mills.

NEW PATENTS.



1,045,803. Tinner's Tongs. Earl Allen, Glen Easton, W. Va. Filed March 16, 1912. Serial No. 684,151.

1,045,813. Tool-Holder. James Carr, Syracuse, N. Y., assignor to The Henry G. Thompson & Son Company, New Haven, Conn., a Corporation of Connecticut. Filed Feb. 15, 1912. Serial No. 677,733.

1,045,831. Hot-Water Heating System. George H. Gibson, Montclair, N. J., assignor to Joseph S. Lovering Wharton, William S. Hallowell, and John C. Jones, Philadelphia, Pa., doing business as Harrison Safety Boiler Works, Philadelphia, Pa. Filed April 25, 1910. Serial No. 557,369.

1,045,851. Hinge. Andrew C. Johnson, Racine, Wis. Filed April 11, 1912. Serial No. 690,084.

1,045,868. Oil-Can. James B. McCune, Bowen and Burt T. Cubine, Kansas City, Mo. Filed July 25, 1911

1,045,871. Cage. Merle Wesley Miller, Warren, Pa. Filed Feb. 20, 1912. Serial No. 678,920.

1,045,882. Hook. Henry Jay Price, Niagara, Wis. Filed Feb. 7, 1911. Serial No. 607,032. Renewed Oct. 24, 1912. Serial No. 727,605.

1,045,898. Bracket for Curtain-Rods. Frank H. Shaw, Providence, R. I., assignor to C. P. Henry Novelty Company, a Corporation of Rhode Island. Filed Oct. 23, 1911

1,045,993. Cover for Syrup-Cups or Other Vessels. Henry Herbert Lucas, Phoenix, Ariz. Filed Nov. 6, 1911.

1,046,005. Safety-Razor. John F. Murray, Chicago, Ill. Filed May 21, 1910. Serial No. 562,776.

1,046,013. Coffee-Pot. Jennie V. Ramsey, Ronan, Mont. Filed April 25, 1911. Serial No. 623,207.

1,046,027. Caster. Arthur E. Sander, Chicago, Ill. Filed May 27, 1912. Serial No. 699,911.

1,046,033. Adjustable Garden-Hose Supporter. William O. Smith, Oxford, Mich. Filed Feb. 29, 1912.

1,046,063. Scale. Frederick H. Felt, Long Island, Kans. Filed Dec. 12, 1911. Serial No. 665,208.

1,046,071. Door-Hanger. Iver Johnson, Seattle, Wash. Filed Sept. 28, 1910. Serial No. 584,230.

1,046,072. Fastener for Doors, Etc. Richard E. Jones, Hagerstown, Md., assignor to Samuel Price Stevenson, Chester, Pa. Filed Nov. 3, 1909. Serial No. 526,001.

1,046,102. Door-Securing Device. Elisha B. Noel, Cordell, Okla., assignor of one-fourth to Charles O. Carlisle, Cordell, Okla. Filed July 8, 1912. Serial No. 708,341.

1,046,110. Sash-Lock. Henry Schafer, Akron, Ohio. Filed March 18, 1912. Serial No. 684,590.

1,046,116. Fruit-Picker. Alexander R. Shaw, Billings, Mont. Filed April 25, 1912. Serial No. 693,124.

1,046,103. Electric Heater. Leon F. Parkhurst, Pittsfield, Mass., assignor to General Electric Company, a Corporation of New York. Filed April 26, 1909. Serial No. 492,411.

1,046,144. Rake. Edward P. Brady, Plattsburg, Mo. Filed May 31, 1910. Serial No. 564,195.

1,046,179. Locking Device for Safety-Razor Blades. Friedrich W. Groschopp, New York, N. Y., assignor to Kampfe Brothers, New York, N. Y., a Corporation of New York. Filed Jan. 24, 1912. Serial No. 673,121.

1,046,209. Gravitating Hinge. Josias J. Mercer, Crowder, Mo., assignor of one-third to Samuel D. Adkins and one-third to Floyd D. Marshall, Crowder, Mo. Filed Aug. 21, 1912. Serial No. 716,296.

1,046,223. Breast-Drill. Joseph H. Rusby, Nutley, N. J. Original application filed Sept. 18, 1909. Serial No. 518,308. Divided and this application filed Aug. 1, 1911.

1,046,230. Stove-Polishing Mitten. Nellie M. Springhorn, Blue Point, N. Y. Filed Apr. 17, 1912.

1,046,241. Sheet-Metal Lever-Socket. Edward L. Watrous, Des Moines, Iowa, assignor to David B. Gann, Chicago, Ill. Filed March 8, 1909. Serial No. 482,142.

1,046,263. Cooking Utensil. Fred Dorr Calkins, Welsh, La. Filed April 13, 1910. Serial No. 555,213. Renewed May 7, 1912. Serial No. 695,782.

1,046,268. Firearm. Lyman H. Cobb, Fitchburg, Mass., assignor to Mary Elizabeth Johnson, trustee. Filed July 3, 1909. Serial No. 505,929.

1,046,301. Window-Sash Lock. Benjamin J. Jacoway, Memphis, Tenn. Filed March 1, 1912. Serial No. 680,793.

1,046,313. Lock. Walter Louczynski, Detroit, Mich. Filed Oct. 6, 1911. Serial No. 653,187. Renewed Oct. 19, 1912. Serial No. 726,805.

1,046,316. Clothes-Rack. Blair L. Mohney, McKeesport, Pa. Filed Feb. 27, 1911. Serial No. 611,190.

1,046,336. Sliding-Door Lock. George V. Schatz, Republican City, Nebr. Filed Jan. 18, 1912. Serial No. 671,944.

1,046,348. Lawn-Sprinkler. Walter Van E. Thompson, Los Angeles, Cal. Filed Dec. 28, 1910. Serial No. 599,709.

1,046,358. Bed-Rail Lock. John Wilson, Everett, Wash. Filed Jan. 28, 1911. Serial No. 605,227.

1,046,366. Spade and Shovel. Henry H. Altvater, Fowler, Mich. Filed Dec. 26, 1911. Serial No. 668,010.

1,046,377. Ash-Can Cover. Edwin Miers Coryell, South Orange, N. J. Filed March 28, 1912. Serial No. 686,765.

1,046,406. Shade-Roller Bracket. Brooks H. Tune, Sherman, Tex., assignor of one-half to George W. Tune, Sherman, Tex. Filed June 8, 1912. Serial No. 702,624.

TRADE REPORT

IRON AND STEEL.

As the year is nearing its close it is recognized that new production records will be established in nearly every department of the iron and steel industry.

Reports from various steel manufacturers indicate that specifications against contracts are coming forward rapidly and no cancellations are being received. Nor is it probable that at the end of the year there will be any tonnage to be cancelled. Purchasers of steel have taken their monthly pro ratas on contracts and their chief concern is to secure deliveries rather than to curtail them.

During the week the U. S. Steel Corporation made a report showing that at the close of business Nov. 30, the Corporation had on its books 7,852,883 tons of unfilled orders, an increase of 258,512 tons over the unfilled orders on hand Oct. 31, and a new high record. The increase was in line with expectations. At the present rate of operation the business would run the corporation well over the middle of 1913. In this connection an official asserts that if every ton of business on the corporation's books were wiped out it could be replaced at once from the heavy tonnage under negotiation.

The demand for all sorts of steel material from abroad is increasing and reports from foreign points indicate that prices for plates, shapes, and other steel products are higher than the prices prevailing in this country, an unusual condition.

Notwithstanding the general prosperous condition, however, it is becoming evident that the entire iron and steel market is on a basis of decidedly less activity than in October and early November, and while this does not mean poorer business later it is a fact to be considered. Pressure for deliveries, however, is strong as ever.

Manufacturers of wrought steel pipe have put out a new card effective Jan. 1, making sweeping changes in weights and sizes but working only a few slight changes in prices. The new card establishes a definite wrought steel pipe basis not founded on the wrought iron pipe card as the old card, theoretically was.

Manufacturers of wire products are buying liberally for February delivery anticipating an early advance in wire prices, although it is stated that the independent wire makers who have been endeavoring to maintain their advance of $1 a ton in wire products, which started Oct. 10, have had no co-operation from the American Steel and Wire Company, and there is little prospect of any, so that this advance may not be maintained.

Railroad buying has not been as heavy in the past two weeks as for several weeks previous. Compared with predictions that were made, the present relative slowness is a matter of some consequence, but regarded in the light of conditions, the amount of railroad business now on books, and the season of the year, the state of railroad buying at the moment is by no means bad.

TIN.

The tin market was more or less unsettled with more activity at the beginning than at the close of the week. After a period of firmness early in the week, at which prices advanced close to the 50c basis, considerable selling pressure developed and quotations declined to 49⅛c per pound for spot and nearby tin. Sentiment in the trade was mixed, with consumers looking for further concessions. Sales of futures were put through on the basis of 49¼c per pound late in the week, while spot sold down to 49⅛c on odd lots. Supplies on hand were ample to meet current requirements, and large consuming interests appeared to be in no hurry to take hold.

Business was stagnant toward the close of the week. There were some orders in the market for late December and January at 49.50, which found no sellers. Consumers are showing more interest, however, and at the decline a good business will probably be done before night from this quarter.

While spot and futures are alike abroad, futures held higher than spots here owing to the probability of advance in rate of exchange. Consumers apparently have given up all efforts of basing their operations on their judgment as to what the market is going to do, appear satisfied to buy freely on declines in the hope, in this way, of being able to show a good average on their purchases.

COPPER.

Buying in the copper market has been resumed by domestic consumers on hearing that the November report of the Producers' Association was not as unfavorable as they at first were inclined to believe. The November report of the Copper Producers' Association revealed an addition to surplus stocks of 9,419,095 pounds. As this addition has increased the total surplus to only 86,164,659 pounds, or about a six weeks' consumption, the report failed to weaken the London speculative market, which was closing when the statement was published.

The only unfavorable feature of the metal market at present is found in the decreased exports. These are due in part to the recent financial panics in the various financial centers of Europe, inability to borrow readily having caused consumers there to draw on the surplus supplies which they accumulated when the price of the metal was much lower.

Another important factor in the market is the very heavy export movement of other commodities, which has made it extremely difficult to obtain shipping facilities for copper, which, because of its compact form and great weight, commands a lower freight rate than most other materials exported. Producers

are supplying the current demand without any advance in price.

COKE.

Despite the recent increase in the output of coke in the Connellsville region, prices are being very strongly maintained for high grade coke, and the production is still insufficient for all requirements. For prompt shipment, coke continues to command $4.25 at a majority of the Connellsville plants and $4 at the Latrobe ovens. The 72-hour grade, which is almost as scarce as the furnace description, is selling at $4.50 for prompt shipment from Connellsville ovens and at $4.25 from Latrobe works.

A large number of contracts for furnace and foundry coke have been placed by consumers with the Connellsville ovens. Two of the largest independent producers there have sold an enormous tonnage for delivery throughout the first half of 1913 at $3.25 for 48-hour and at $3.50 for 72-hour. Another large producer has sold 75 per cent of his output of 48-hour coke for all of 1913 on a basis of $3.25. A further stiffening of prices is looked for when the output decreases during the holidays. The volume of business in prompt shipments is diminishing as the year closes.

The operators are endeavoring to make full shipments on contracts, and in some cases even to ship an excess, against the possible trouble around the holidays.

There is a distinct improvement in the box cars for the foundry trade, and coal cars are also more plentiful. Complaints from shippers are less serious.

SCRAP IRON.

The scrap market is far from active, although prices are being held rather firmly. Among dealers generally the fact that the market has not weakened further in the past two weeks as a result of the sudden decrease in interest on the part of consumers is regarded as a very favorable sign.

There is less material sold at low prices and dealers are somewhat firmer in their attitude. As the mills have been using up material as rapidly as ever, and have been buying very little, the market is approaching a position in which more business will be done, and as the practical stopping of buying has not precipitated any important break the prospect now is that buying will be resumed at substantially prices now prevailing.

Steel grades are especially slow. This may be accounted for in part by the prolonged embargo that has barred scrap deliveries at the Inland Steel Company's Indiana Harbor mills for several weeks. The embargo was declared on October 28th and is still effective. Dealers whose deliveries have been held up are inclined to question the regularity of procedure under which this embargo has been prolonged.

The usual extension of open weather and consequent freedom from delay to traffic usually encountered on account of the cold weather and storms at this season of the year, has helped to strengthen the position of scrap consumers.

PIG IRON.

Quite a decided falling off in purchasing operations has been noted in all grades of pig iron within the week as a result of the approach of the turn of the year and inventory-taking time. Prices continue to be very firmly held for foundry and forge grades and are still manifesting an advancing tendency for the steel-making irons.

In many instances foundries are asking the producers, with whom they have contracted for first quarter iron, to anticipate deliveries on their contracts by shipping some of the metal to them before it is due and, as the furnaces are refusing to accommodate their customers in this way except in a few cases, the latter are being compelled to buy additional tonnages for prompt delivery.

A number of new inquiries for small "filling in" tonnages of foundry iron have been issued since the beginning of this week, but there are few calls for sizable lots, with the exception of an inquiry just put out by the Norfolk & Western Railway. This road has entered the market for 5,000 tons of special analysis iron, including the equivalents of Nos. 1X and 2X, for delivery at its car shops in Roanoke, Va. At Pittsburgh a 30,000 ton sale of basic iron for delivery over the first half is reported at $16.35 at Valley furnace, though for 5,000 tons of December basic $16.50 was paid.

Furnaces running on basic irons, it is reported, have their output so far ahead that they have raised prices for prompt shipments to a record-breaking level of $17 at Valley furnaces, the equivalent of $17.90, delivered in Pittsburgh. At least 10,000 tons of this grade of steel-making iron have been purchased by independent steel manufacturers at this figure.

CHICAGO MARKET.

Lake Superior charcoal	$18.75@19.25
Northern Foundry No. 1	18.50
Northern Foundry No. 2	18.00
Northern Foundry No. 3	17.75
Southern Foundry No. 1	18.85@19.35

PITTSBURGH MARKET.

No. 2 foundry	$18.40@18.90
Gray forge	17.65@17.90
Bessemer	18.15@18.40
Malleable	17.90@18.40
Basic	17.40@17.90
Southern No. 2	18.90@19.40
Southern forge	17.90@18.40

BIRMINGHAM MARKET.

No. 2 foundry	$14.00@$14.50
No. 3 foundry	13.50@14.00
No. 2 soft	14.00@14.50

Matthew Addy & Company, of Cincinnati, Ohio, in their weekly market report for December 14, 1912, say:

There is a renewed feeling of confidence in the stability of the market. It has been thoroughly tested in the past few weeks and the sum and substance of it is that there is more demand for iron than can be filled. Offers at low prices have found no takers. There is no temptation to cut the established market prices. Every furnace is rushed to keep its customers satisfied and few of them are up to date in shipments. Most furnaces are behind on deliveries and consumers are specifying iron ahead of time. We are having many requests to forward January iron this month. As a rule at this season of the year there is a distinct lull, but it is not in evidence now.

Buying has been regular, but the tonnages of new sales have not been large. But they have been sufficient to crowd the furnaces to the limit, and it looks as if a heavy buying movement would come shortly after the new year, for it is a fact that not nearly all the iron has been bought that melters will need.

Railroads are making poor time. We have had cars on the road twenty-one days between Ironton and Hamilton, and railroad equipment is hard to get.

The coke situation does not improve. On the contrary the coke ovens seem to be having more and more difficulties and apparently it is going to be a struggle to get coke all through the winter.

Current Hardware and Metal Prices.

AMERICAN ARTISAN AND HARDWARE RECORD is the only publication containing Western Hardware and Metal prices corrected weekly.

METALS.

FIRST QUALITY BRIGHT PLATES.

		Per Box.
IC	14x20	$7 40
IX	14x20	8 50
IXX	14x20	9 50
IXXX	14x20	10 60
IXXXX	14x20	11 70
IC	20x28	14 80
IX	20x28	17 00
IXX	20x28	19 00
IXXX	20x28	21 20
IXXXX	20x28	23 40

COKE PLATES.

Cokes, 180 lbs		20x28	$ 8 30
Cokes, 200 lbs		20x28	8 50
Cokes, 216 lbs	IC	20x28	8 80
Cokes, 270 lbs	IX	20x28	10 50

PIG IRON.

North'n Fdy., No. 1	$15 00
North'n Fdy., No. 2	14 50
North'n Fdy., No. 3	14 25
Southern Fdy., No. 1	16 10
Southern Fdy., No. 2	15 85
Southern Fdy., No. 3	15 60
Lake Sup. Charcoal	16 50
Malleable	14 50

BLUE ANNEALED SHEETS

No. 10, per 100 lbs.	$2 25
No. 12, per 100 lbs.	2 0
No. 14, per 100 lbs.	2 35
No. 16, per 100 lbs.	2 45

ONE PASS COLD ROLLED BLACK

No. 18-20	$2 60
No. 22-24	2 65
No. 26	2 70
No. 27	2 75
No. 28	2 80

GALVANIZED

No. 16, per 100 lbs.	$3 30
No. 18-20, per 100 lbs.	3 45
Nos. 22-24, per 100 lbs.	3 60
No. 26, per 100 lbs.	3 75
No. 27, per 100 lbs.	3 90
No. 28, per 100 lbs.	4 05
No. 30, per 100 lbs.	4 35

POLISHED SHEET STEEL.

No. 24, per 100 lbs	$4 45
No. 26, per 100 lbs.	4 55
No. 27, per 100 lbs.	4 65
No. 28, per 100 lbs.	4 75

SMOOTH STEEL.

Wood's Smooth, No. 20	$3 25
" " No. 22-24	3 30
" " No. 25-26	3 35
" " No. 27	3 40
" " No. 28	3 50

PATENT PLANISHED SHEET IRON.

Patent Planished Sheet Iron, 100 lbs	$9 71

PATENT PLANISHED SHEET STEEL.

Dickey Planished Sheet Steel	8½c

SOLDER

XXX Guaranteed ½ & ½, per lb.	30c
Commercial ½ & ½, per lb.	29c
No. 1 Plumbers	26c

SHEET ZINC.

Cask lots	$9 25
Less than Cask lots	9 50 to 10 10

COPPER.

Copper sheet, base	23c

LEAD.

American Pig	$4 60
Bar	5 10
National (White) brands (in less than 100 lb lots), per lb.	7c

Sheet.

Full coils, per 100 lbs.	$6 25
Cut coils, per 100 lbs.	6 25

ALUMINUM.

Carload lots.

No. 1 Pure Ingot, per lb.	$0 24
Sheets "	33

TIN

Pig tin	$53 00
Bar tin	54 00

HARDWARE.

ADZES.

Carpenters'.

Plumbs	40%

Coopers'.

Barton's	15%
White's	15%

Railroad

Plumbs	40%

Ship.

Plumbs	40%
White's	15%

AMMUNITION.

Caps, Percussion—per 1,000.

F. L Waterproof, 1-10s	47c
G D	35c
Musket	68c

Shells, Loaded—

Loaded with Black Powder	40%
Loaded with Smokeless Powder, medium grade	40 & 5%
Loaded with Smokeless Powder, high grade	40 & 10 & 10%

Winchester:

Smokeless Repeater Grade	40 & 5%
Smokeless Leader Grade	40&10&10%
Black Powder	40%

Gun Wads—per 1,000.

Winchester Gun Wads	15%

Powder.

	Each.
DuPont's Sporting, kegs	$5 25
" " ½ kegs	2 90
" " ¼ kegs	1 60
DuPont's Canisters, 1-lb.,	25
" " ½-lb.,	15
" Sm'k'less Drums	23 49
" " Kegs	11 88
" " ½-Kegs	6 08
" " 10-Can Drum	4 86
" " ¼-Kegs	3 12
" Canisters	54

Shot.

Drop shot, sizes smaller than B, 25-lb. bags, per bag	$1 95
Drop shot, B and larger sizes, 25-lb bags, per bag	2 20
Buck Shot, 25-lb. bags, per bag	2 20
Chilled Shot 25-lb. bags, "	2 20

ANCHORS

Expansion Screw Anchors	60%

ANVILS

Trenton, 70 to 80 lbs.	9½c per lb
Trenton, 81 to 150 lbs.	9½c per lb.

ASBESTOS.

Board and Paper	2.75 Cwt.

AUGURS.

Boring Machine	70%
Irwin's	40&10%
Carpenter's Nut	70%

Hollow.

Bonney's—list $30.00	75&5%
Stearns, No. 3	36 00

Post Hole.

Digwell, 8-inch, per doz.	12 50
Iwan's Post Hole and Well	40%
Vaughan's, 4 to 9-in., per doz.	6 60

Rafting.

Sneil's	50&5%

Ship.

Ford's, with or wi'out screw	40-10%
Snell's " " "	40-5%

AWLS.

Brad.

No. 3 Handled, per doz.	$0 40
No. 1050 Handled "	95
Shouldered, assorted, 1 to 4, per gro.	$3 60
Patent asst'd, 1 to 4 "	75

Harness.

Common "	95
Patent "	90

Peg.

Shouldered "	1 50
Patent "	65

Scratch.

No 1 handled "	4 80
No. IS, socket handled per doz.	1 25
No. 7 Stanley	1 80

AXES.

Boy's Handled.

Lippincott, 3 lb., per doz.	$6 50
Marshall Falls City "	5 50

Broad.

Plumbs, West, Pat	33⅓%
" Can. Pat	35%
" Firemen's (handled) per doz	$19 00
Plumbs, Miners' (handled) "	9 00

Single Bitted (handled)

Blood's Champion	$12 00
Blood's Dull Finished	10 50
Rough Rider	8 75
Niagara	7 75
Perfect Premier, Forest Clipper	10 00
Duquesne	6 75

Single Bitted (without handles)

Blood's Champion	$9 50
Blood's Dull Finish	9 00
Rough Rider	7 25
Electric Chopper	8 25
Duquesne	5 50
Crown	6 25

Double Bitted (without handles).

Blood's Champion, 3½ to 4½ lbs. per doz	$11 50
Flint Edge "	9 75
Perfect Premier " "	11 00

The above prices on axes of 3 to 4 lbs. are the base prices.
3½ to 4½ lbs advance 25c
4 to 5 lbs. advance 50c.
4½ to 5½ lbs. advance 75c.

BAGS, PAPER NAIL.

Pounds	10	16	20	25
Per 1,000	$2.50	3.75	4.50	5.00

BALANCES, SPRING

Frary's	40%
Pelouze	20%

BARS, CROW.

Pinch or Wedge Point, per cwt.	$3 75

BASKETS.

Clothes.

Small Willow, per doz.	$7 00
Medium " "	8 75
Large " "	10 50

Galvanized Iron.

	½ bu.	1 bu.	1
Per doz	$3 75	5 40	7 20

BEATERS.

Carpet. per doz.

No. 13 Tinned Spring Wire	$0 95
No. 11 Spring Wire coppered	1 30
No. 10 Preston	1 00

Egg. Per doz.

No. 50 Imp. Dover	$0 75
No. 102 " " tinned	85
No. 150 " " hotel	1 00
No. 10 Heavy hotel tinned	2 10
No. 13 " " "	3 30
No. 15 " " "	3 60
No. 18 " " "	4 50

BELLOWS.

Blacksmiths'	65%

Hand.

8-inch, per doz.	$8 50
10-inch "	10 50

Moulders'.

12-inch "	13 00

BELLS.

Call.

3-inch Nickeled Rotary Bell, Bronzed base, per doz.	$5 00

Cow.

High Grade	60%
Kentucky	65&10%

Door. Per doz.

New Departure Automatic Rotary.	$6 50
3 -in. Old Copper Bell	4 00
3 -in. Old Copper Bell, fancy	6 00
3 -in. Nickeled Steel Bell	4 50
3½-in. Nickeled Steel Bell	5 00

Hand.

Hand Bells, polished	40&10%
White Metal	40%
Nickel Plated	30%
Swiss	40&33⅓%
Silver Chime	33⅓%

Miscellaneous.

Church and School, steel alloy	50%

Farm, lbs.	40	50	75	100
Each	$1.90	2.40	3.55	4.75

BEVELS, TEE

Stanley's, rosewood handle, new list	25%
Stanley's iron handle	25%

BINDING, OILCLOTH.

Zinc	75&10%
Brass	70&10%
Brass plated	75%

BITS.

Auger.

Extra Double Spur	70&10%
Ford's Car and Machine	40&10%
Ford's Ship	40&10%
Irwin	50%
Russell Jenning's	30&10%
Clark's Expansive	65%
Steer's " Small list, $22.00	25%
" " Large " $26.00	25%
Irwin Car	50%
Ford's Ship Auger pattern Car	40&10%
Center	15%

Countersink.

No. 18 Wheeler's, per doz.		$1 60
No. 20 "	"	2 40
American Snailhead	"	1 10
" Rose "	"	1 20
" Flat	"	1 00
Mayhew's Flat	"	90
" Snail	"	1 40

Dowell

Russell Jennings	30&10%

Gimlet.

Standard Double Cut		40%
German Pattern, per doz.		$0 60
German	"	65
Gouge	"	80
Spoon	"	15%
Countersink	"	1 30

Reamer.

Jenning's Square	"	2 50
Standard Square	"	2 00
American Octagon	"	1 75

Screw Driver.

No. 7 Common	"	55
No 1 Triumph	"	1 25

BLACKING, STOVE. (See Polish).

BLADES, SAW

Butchers'.
Standard, ¾ & 1¼-in. 35%
Clock Spring 35%
Star 15%
Hack.
Disston's ..... 25&5%
Flexible 30%
Star ..... 20&5%
Wood.
Jackson's ..... per doz. $2 2
Disston's—No. 6, 16, 26 & 045 .. 4 7
Triumph 3 8

BLOCKS.

Snatch.
Wooden ..... 70&10%
Steel 50%
Tackle.
Iron Strapped ..... 70&10%
Com. Steel 60%

BOARDS.

Stove.
Wabash Crystal ..... Net Prices
Wabash Oriental ..... "
Wabash Mosaic ..... "
Wabash Aluminum ..... "
Wabash Art Inlay ..... "
Wash.
No. 760, Banner Globe, (singl·) ..... per doz. $2 75
No. 652, Banner Globe (single) ..... per doz. 3 25
No. 862, White Hen (glass) ..... per doz. 3 75
No. 800, Brass King ... " 3 60
No. 172, Our Best (soap saver) ..... per doz. 3 25
No. 964, Royal Blue (enamel) ..... per doz. 3 25

BOBS, PLUMB.

Carpenters'.
No. 2, iron ..... per doz. $0 70
No. 00, " ..... " 1 30
No. 0, " ..... " 2 75
No. 3, lead ..... " 2 75
No. 4, " ..... " 3 40
No. 113, brass plated .. " 1 10
No. N30, nickel plat'd. " 1 30

BOLTS.

Carriage, Machine, etc.
Carriage, ¾x6 and sizes smaller and shorter ..... 70&10%
Carriage, sizes larger and longer than ¾x6 ..... 65&5%

Machine, ¾x4 add sizes smaller and shorter ..... 70&10%
Machine, sizes larger and longer than ¾x4 ..... 65&10%
Plow ..... 60&10%
Stove ..... 80&10%
Tire 75%
Wagon Box Strap 70%
Mortis, Door.
Gem, iron 60%
Gem, bronze plated 20%
Barrel.
Cast 60%
Wrought ..... 75&10%
Wrought, bronzed ..... 50&10%
Flush.
Wrought ..... 40&10%
Spring.
Wrought ..... 75&10%
Wrought, heavy ..... 70&10%
Square.
Cast ..... 50&10%
Wrought 70%

BORERS.

Angular.
Miller's Falls ..... per doz. $13 75
Bung.
Doz.
Enterprise Mfg. Co 's No 1 .. 15&5%
" " " No 2 .. 15&5%

BOXES

Mail, No. 1 2 10
Per doz $3.50 5.00 15.00
Miter.
New Langdon ..... 15&5%
Stanley's 30%
Seavey's ..... each, $1 50

BRACES.

Fray's Genuine Spofford's 60%
" Nos. 66 to 146 ..... 50%
" No. 0108 ..... $3 50
" No. 08 ..... 3 00
" No. 010 ..... 3 30

BRACKETS.

Hay-Rack.
Wenzelmann's No. 1, per doz. $9 50
" No. 2, " 10 00
Shelf.
Cast Iron, bronzed ..... 50-10&5%
Clover Wrought Steel 75%
Clover Folding 65%

BROILERS.

Wire 70%
No. Crown, Self-basting 80doz .. $2 50

BUCKETS.

Pump, Rubber.
Wychoff ..... per gro. $4 75
Cooper ..... " 4 75
Champion ..... " 7 50
Victor ..... " 9 25
Star ..... " 5 00
IXL ..... " 6 75
Well.
Galv'd Qts 10 12 14
Per doz $2.90 $3.25 $3.40
Wooden, top ear, plain, per doz. 4 00
" " swivel, " 5 10

BUCKS, SAW.

Folding ..... per doz. $2 40

BURRS, RIVETING.

Copper Burrs only 15%
Tinners' Iron Burrs only ..... 65&5%

BUTTS.

Cast Iron ..... 70&5%
Wrought Brass (New List) .... 50&10%
Wrought Steel, Bright 75%
Wrought Steel, Japanned ..... Net

CALIPERS.

Double 35%
Inside and Outside 35%
Wing 30%

CALKS.

Logger's Boot.
(Lufkin R. Co.'s), per M $3 75
Toe.
Shoenberger ..... per lb 5 c
Bessemer ..... " 4½c
American ..... " 7 c
Swedes ..... " 8½c

CANS.

Milk.
Holstein.
Nos 300 301 302
Gals 5 8 10
Per doz $20 25 $22 70 $23 95
Gem Pattern.
Nos 400 401 402
Gals 5 8 10
Per doz $17 75 $20 25 $21 45

Illinois Pattern.
Nos ..... E. 2 E. 3
Gals 8 10
Per dozen $23.50 $26.50
Jersey Pattern.
Nos 80 81
Gals 8 10
Per doz $23.00 $27.00

CAN OPENERS.

See Openers.

CAPS, GUN.

See Ammunition.

CARPET STRETCHERS.

See Stretchers.

CARRIERS.

Hay.
Diamond, Regular ..... each, $3 85
Diamond, Sling ..... " 7 00
Myers' Imperial ..... " 3 85
Myers' Clover Leaf ..... " 4 00

CARTRIDGES.

See Ammunition.

CASTERS.

Standard—Ball Bearing ..... 50&10%
Bed ..... 60&5%
Common Plate.
Brass Wheel ..... 60&10%
Iron and porcelain wheels, new list ..... 60&5%
Philadelphia Plate, new list 60%
Martin's 60%
Payson's ..... 75&10%

CATCHERS, GRASS.

Carroll's, No. C ..... per doz. $4 25
Wildermuth's,.
Nos 1 2 3
Per doz $5.00 $5.75 $6.25
Nos 4 5 6
Per doz $6.75 $9.50 $10.00

CHAIN AND CHAINS.

Breast Chains.
Doubleslack ..... doz. pairs, $5 75
With Covert Snaps. " 5 00
With Slide ..... " 3 25
Without Slide ..... " 2 85
Bright Ox Chains.
¼-in. $7.25; ⅜-in. $5.45 per 100 lbs.
Cable Coil Chain.
Inch ..... 5/16 ¼ 7/16 ⅜
Per 100 lbs. $10.80 $8.00 $7.00 $6.20
Inch ..... 5/16 ⅜ ½ ⅝
Per 100 lbs. $6.00 $5.90 $5.75 $5.65
Inch ..... ¾ 1 1¼
Per 100 lbs $5.55 $5 55 $5.65

Cable Log Chain.
Advance 25c per 100 lb. on Cable Coil.

Coil Chains, German Pat.
3/0—2/0 ..... 70%
0—1—2 ..... 66⅔%
3—4—5 ..... 65%

German Pat. Halter Chains.
4/0 to 0 ..... 66⅔%
1—2—3 ..... 65%
4—5—6 ..... 60%

German Machine Chain.
3/0—2/0—1/0—1 ..... 40&10%

Picture Chains.
Light Brass, 3 ft ..... per doz. $0 60
Heavy Brass, 3 ft .... " 1 00

Pump Chain
Galvanized, per 100 lbs $5 50

Safety Chain.
Brass 60%

Sash Chain. (*Morton's.*)
Steel per 100 ft.
0 ..... $1 20
2 ..... 1 60
1 ..... 2 40

Copper.
OR 2 00
2R 2 70
1 ..... 3 35

Champion Metal.
2H 3 00
1H 4 50

Cable Sash Chain.
Steel 35%
Copper 25%

Special Steel Loading Chain.
Inch ..... ⅛ ¼ ⅜
Per 100 lbs $16.00 $13.50 $12.50

Stretcher Chains.
⅛-in. $8.50; ¼-in. $7.75 per 100 lbs.

Tie-Out Chains.
Brown's ..... 70&5%
Trace Chains.
Western Standard.
6½ — 6-2 ..... per pair 30c
6½ — 8-2 ..... " 34c
6½ — 8-3 ..... " 33c
6½ — 10-2 ..... " 38c
Add 2c per pair for Hooks.
Add 2c for Twist Link
Wagon Stay Chains.
Inch ..... ⅛ ¼ ⅜
Per 100 lbs ..... $6.50 $6.00 $5.5[illegible]

CHALK, CARPENTERS'.
Blue ..... per gro. 80c
Red ..... " 70c
White ..... " 60c
Common White School Crayon ..... " 11c

CHARCOAL.

In bags .. .. per bag 95c

CHECKS, DOOR.

Blount 30%
Sargent's 25%

CHIMNEY TOPS.

Swan's Volcano 50%

CHISELS.

Box
Inches 10 12 14
Round per doz ..... $3.00 $3.50 $3.8[illegible]
Flat " ... 4.00 5.00 5.5[illegible]
Cold.
Good quality, ¼ in. and larger ..... per lb. .13c
Smaller size per doz .....
Socket, Framing and Firmer.
Clover ..... 75&10%
Tanged, Firmer.
With handles 20%
Choppers, See *Cutters, Meat.*

CHUCKS, DRILL.

Goodell's, for Goodell's Screw Drivers ..... per doz. $6 25
Yankee, for Yankee Screw Drivers 5 00

CHURNS.

Anti-Bent Wood,
Gal 5 7 10
Each $3.90 $4.60 $4 85
Belle, Barrel ..... 65&7½%
Common Dash, Gal. 4 5 6
Per doz $9.00 $10.00 $10.80
Union, Gal 5 7 10
Each $3.75 $4.35 $5.40

CLAMPS.

Adjustable.
Martin's 30%
Carpenters'.
Steel Bar 25%
Hose.
Sherman's, brass, ¾-in., per doz .. 42c
Double brass, ¾-in., " 90c

Saw Filers
Disston's list, $30.00 ..... 30%
Stearns', No. 0, $3.50; No. 1, $11.50; No. 3, $5.00 doz.
Wentworth's, No. 1, $6.25; No. 3 $8.75.

CLAWS, TACK.

Cast, wood hdle ..... per doz. 45@60c
Forged steel, wood hdle " $0.80
Solid steel ..... " 1 00
Giant ..... " 50

CLEANERS.

Drain.
Iwan's Adjustable 55%
Iwan's Stationary ..... 40&5%
Pot.
Wire ..... per doz. $0 75
Side-Walk.
Steel ..... per doz. $3 25
XLCR ..... 65&5%

CLEAVERS

Family.
Griffin, Inch 6 7 8
Per doz $5 50 $5.75 $6.25
Royal ..... per doz. 2 25
Butchers.
Plumbs 25%

CLEVISES

Malleable ..... 6c lb.

CLIPPERS.

Bolt ..... $1.90@4.75

CLIPS.

Axle ..... 65&5%
Damper.
Standard ..... per doz. 65c
Troy ..... " 38c
Hame ..... " 17

CLOTH

Emery.
Star 50%
B. & A 50%
Hardware Wire—full rolls (100 ft.)
1 to 3 incl., Galv.—in full roll ... 3 00
4 and 5 ..... " .. 3 25
6 ..... " .. 3 50
7 and 8 ..... " .. 4 00
Screen Wire.
12 mesh, painted, per 100 sq. ft.. 1 15

COCKS AND FAUCETS.

Compression Plain Bibbs. .60, 10&5%
Lever Bibb Cocks ..... 60, 10&5%
Compression Hose Bibbs .. 50—10&5%

Telegraph Faucets (new list) .. 50—5%
Racking Cocks (new list) ... 60&10&5%
Compression Lock C'ks (new list) .. 70%
Andrew's Brass Faucets 70%
Angle Plug Faucets, per doz $0 85
Milk Can Faucets, per doz .. $2.60-4.20
Petroleum Faucets 70%

COLLARS, STOVE PIPE.

Inches 5 6 7
Plain Tin .. per gro. $1.90 $2.40 $3.50
Japanned Tin " 3.00 3.50 4.25
Lacquered Tin " 3.60 4.20 4.80

COMBS, CURRY.

Nos ... 000 11 15 39 89 108
Per Doz .. $.37 .60 1.90 .90 1.15 .80
Nos ... 299 320 390 532 620 1400
Per Doz. $1.05 .85 1.35 1.20 .75 1.40

COMPASSES.

Carpenters' 60%
Pencil—Faber's ..... per doz. $1.00

COPPER—See Metals.

COPPERS.

Soldering.
1 lb ..... per lb 36½c
1½ lb ..... 33½c 2 lb ... " 32½c
3 lb and larger ..... " 30c

CORD.

Picture
White Wire (new list) 85%
Sash.
Regal Brand ..... per lb 35c
Puritan Brand ..... " 25c

CORKSCREWS.

Walker's 33⅓%
Williamson's Regular ..... 40&10%
Williamson's Forged Worm 50%

COTTERS SPRING.

All sizes—new list 90%

COUPLINGS, HOSE.

Brass ..... per doz. $1 00
Brass Plated ..... " 85

COVERS, WAGON—See Tents.

CRADLES, GRAIN.

Morgan's Grapevine .. per doz. $22 25

CRAYONS—See Chalk.

CROW BARS

nch or Wedge Point.....per lb 3½c

CUTTERS.

Glass.
Red Devil.....45%
Smith & Hemenway Co.....50%
Woodward.....40%
Meat.
Enterprise, Nos. 5, 10, 12, 22, 32 and 42.....25%
No. 202, list, $1.50 ea.....40&7½%
Pipe.

Stanwoods. No....	1	2	3
Each.....	$0.85	$1.50	$4.00

Slaw and Crout.

3-knife Crout.....per doz.		$11 50
1-knife Slaw.....	"	1 75
2-knife Slaw.....	"	2 50
Washer.....	"	7 75

DAMPERS, STOVE PIPE.

Jewel.....50&10%
American.....50%

DIES AND STOCKS.

Discount.....40%

DIGGERS.

Post Hole.

Acme.....per doz.		$9 25
Atlas.....	"	9 00
Eureka.....	"	7 50
Hercules.....	"	10 25
Iwan's Split Handle..	"	7 50
Iwan's Perfection....	"	9 00
Iwan's Hercules pattern	"	10 00
Ryan's.....	"	17 00

See also Augers—Post Hole.
Dividers, Wing.....65&10%

DOOR CHECKS—See Checks.

DOORS, SCREEN.

½ in. 4-panel, painted..... Net Prices
1½ in. 4-panel painted..... "
1½ in 3-panel, natural pine, fancy..... "

DOOR HANGERS—See Hangers.

DRILLS.

Bit Stock.....60&10%
Blacksmith's Twist.....60%
Breast.
Fray's No. 9.....each, $1 75
Millers Falls No. 12..... " 2 00
Hand.

Goodell's Automatic. Nos.....	01	03	3	20
Per doz..	$7.75	$11 50	$12.50	$11.00

Goodell's Single Gear..per doz. 15 75
Millers' Falls " " " 12 75
" " Double " " 15 25
Reciprocating.
Goodell's.....per doz. 16 50
Bit Stock.
Standard List..60&5%@60%@10

DRIVERS, SCREW.

Standard.....65&10%
Lock Ferrule.....60%
Champion.....50%
Champion Pattern.....70%
Clark's Interchangeable.....30%
Edison.....60%
Reed's Lightning.....45&5%
Goodell's Spiral.....50, 10, 5&2½%
Yankee Ratchet.....50%
" " Spiral.....50&10%
Smith & Hemenway Co.....40&5%

EAVES TROUGH, GALVANIZED

Terms, 2% for cash. Factory shipments generally delivered.

See also conductor pipe and elbows

EGG BEATERS—See Beaters.

ELBOWS—Stove Pipe.

Adjustable Stove.

Inches.....	5	6	7
Smooth, per doz..	$0.10	$0.85	$1.20
Plan'd, "	2.00	2.25	2.50

Corrugated Stove

Inches.....	5	6	7
Smooth, per doz..	$0.75	$0.90	$1.10
Pol'd, " ..	1.40	1.65	2.35
Plan'd, " ..	2.25	2.90	3.75

Four-Piece Stove.

Inches.....	5	6	7
Smooth, per doz..	$0.60	$0.65	$0.95
Planished. " ..	1.75	1 95	2.55

ELBOWS—Conductor Pipe.

Plain, round..... 75%
Round, corrugated..... 75%
Square, corrugatee.....60&10%

EMERY CLOTH—See Cloth.

EMERY TURKISH.

Size.....5-lb. pkgs.	½ kegs.	kegs.
No 60 to 150, per lb.. 6c	4c	4c
Flour..... " ... c	3c	3c

ENAMEL, IRON.

A-B Iron Enamel, 3 doz. case, ...per gro., 15 00
Peerless..... 1 25

EXTRACTORS, PIG.

See Forceps, Pig

EYES.

Bright Wire Screw—See Goods, B. W.
Drifting Pick.....60, 10&5%
Hooks and—
Brass.....85&10%
Iron.....90%

FASTENERS, STORM SASH.

Schroeder's.....per doz. $0.85
Sensible..... " 1 15

FAUCETS—See Cocks.

FILES AND RASPS.

Lelta.....70%
Nicholson's—
American.....75&10%
Arcade.....75&10%
Black Diamond.....70&10%
Eagle.....75&10%
Great Western.....75&10%
Kearney & Foot.....75&10%
McClellan.....75&10%
Nicholson.....70&10%
J. Barton Smith.....75&10%
X-F Swiss Pattern.....40&10%
Simonds'.....70%
Disston's.....75&10%
Heller's.....70%

FLUE STOPPERS—See Stoppers.

FORCEPS, PIG.

Superior.....per doz. $4 75
Whisson's Imp..... " 5 25

FORKS.

Barley.
Steel New List.....65&10%
Wood, 4-tines, per doz.....$5 00
Hay.
2-tine.....60%
3 " 60%
4 " .....60&10%
Digging.....65&5%
Scoop.....30%
Header.
3-tine.....60&5%
4 " .....60&5%
Manure.
4-tine.....60%

FREEZERS, ICE CREAM.

Arctic.

Qts.....	1	2	3	4	6
Each...	$1.10	1.30	1.50	1.80	2.30
Qts.....	8	10	12	15	
Each.....	$2.95	3.80	4.50	5.20	

White Mountain.

Qts.....	1	2	3	4	6
Each....$1.25		1.60	1.90	2.20	2.80
Qts.....	8	10	12	15	20
Each...	$3.60	4.65	5.85	7.00	9.00

Polar Star.

Qts.....	1	2	3	4
Each.....$.75		1.00	1.50	2.00

GAUGES.

Butt and Rabbet.
Cream Pail.
Fairmont.....per doz. $3 75
Marking, Mortise, etc......50&10%
Saw.
Wire.
Disston's.....25%

GIMLETS.

Discount.....35@40%

GLASS, WINDOW.

Single.....90&20%
Double.....90&25%

GLASSES, LEVEL

3-inch.....per doz. $0 70
2½-inch..... " 55

GLUE.

Bulk.

B Amber.....per lb.		18 c
A White.....	"	18 c
H. S. Amber.....	"	16½c

Liquid.
Army & Navy.....40%
Le Page's—
List "A".....37½%
List "B".....33⅓%
List "C".....25%

GOODS.

Bright Wire.....90%

GREASE, AXLE.

Wood Boxes.

Diamond.....	per gro.	$5 50
Frazer's.....		9 50
Hub Lightning.....		5 25
Paragon.....		6 75

Wood Pails.
Frazer's, 15 lb. 80c; 25 lb. $1.30 each.
Hub Lightning, 15 lb. 55c; 25 lb. 70c each.
Tin Cans.
Chamellene Graphite.

1 lb. per gross.....		$9 50
3 lb. per gross.....		25 00
5 lb. per gross.....		37 00

GRIDDLES.

Soapstone.....33⅓%

GRINDSTONES.

Family.

Inches.....	6	8	10
Per doz.....	$7.25	9.75	12.00

Loose.
Per ton.....$22 00@$23 00
Mounted.

Ball Bearing.....	1	2	3
Each.....	$3.75	3.00	3.35
Common Bearing	1	2	3
Each.....	$3.35	3.15	3.00

GUN WADS
(See Ammunition.)

HAFTS, AWL.

Brad.
Common.....per doz. $0 19
Peg.
Common..... " 22
Patent, plain top..... " 47
Patent, leather top... " 52
Sewing.
Common..... " 22
Patent..... " 52

HALTERS.

Jute Rope.....per doz. $1 10
Sisal Rope..... " 1 85
Web..... " 2 00
Leather, rope tie..... " 8 50
Leather, leather tie..... " 11 50

HAMMERS, HANDLED.

Blacksmiths' Hand.
.....50&10%
Engineers'.
.....50&10%
Farriers'.
.....40&10%
Machinists'.
.....60&5%
Nail.
.....40&7½%
Quaker City.....per doz. $3 85
Cast..... " 1 15
Maydole's.....30&5%
Riveting.
.....40%
Shoe.
Cast.....per doz. $0 95
Tack.
All Iron.....per doz. $0 35
Pol'd Iron, Hickory hdl. " 50
Mall. Iron, Inlaid..... " 1 55
Magnetic..... 1 2 3
Per doz.....$0.70 .80 1.00
Magazine.. .....per doz. 4 75

HAMMERS, HEAVY.

Heavy Hammers and Sledges.
Under 5 lbs 75%
5 lbs. and over.....75&10%
Masons'.
Single and Double Face.....70&10%

HANDLES.

Auger.
Common Assorted....per doz. $0 55
Pratt's Adjustable, Nos. 1 & 2, per doz..... 4 75
Ives' Adjustable.....per set, 1 35
Axe.....35%
Chisel.
Hickory, Tanged Firmer, Assorted, 33c; Large, 38c per doz.
Hickory, Socket Firmer, Assorted, 27c; Large, 30c per doz.
Applewood, Tanged, Firmer, Assorted, 34c; Large, 42c per doz.
Applewood, Socket, Firmer, Assorted .....per doz $0 30
Coal Pick.....40%
Drifting Pick.....40%
File, assorted, 13c; Large, 16c per doz.
Hammer.
Adze Eye.....per doz. 35 to 75c
Blacksmiths'..... " 40c@75c
Machinists'..... " 45c@80c
Hatchet..... " 40
Hay and Manure Fork.....35%
Hoe and Rake.....35%
Plain.....per doz. $0 75
Varnished..... " 80
Screw Driver.
Assorted..... " 37
Large..... " 48
Shovel and Spade.....35%

HANGERS.

Barn Door.
U. S. Rolled Bearing.....60&10%
Matchless.....50&10%
Storm King.....60%
World's Best.....50%
Wagner's Adjustable.....70&10%
Warehouse Big Twin.....25%
Conductor P.
Iwan's Perfection.....50%
Eave Trough.

Baker's.....per gro.	$2 35
Imperial.....	20%
Wire.....	33⅓%

Parlor Door.

Acme.....per set,	$3 75
Ives' Improved..... "	2 50
Lane's Standard..... "	3 50
Lane's New Model.... "	3 10
Le Roy Noiseless..... "	4 00
Richards'.....40-10%	

HASPS.

Hinge, Wrought.....40%
With Staples—See Staples.

HATCHETS.

Crescent.....50&10%
Cast Claw.....per doz. $1 10@1 35
Cast Shingling.... " 1 25
Germantown.....30%

HAY KNIVES.

See Knives.

HAY RACK BRACKETS.

Wenzleman's No. 1.....per doz. $9 00
Wenzleman's No. 2..... " 9 00

HINGES.

Blind.
Clark's Gravity.. per doz. sets, $1 00
Parker's.....65%
Shepherd's Noiseless, for Wood Casing.....per doz $1 00
Gate.

Clark's.....	1	2	3
Hgs & Ltch.. doz.	$2.50	3.25	4.25
Hinges only... "	2.00	2.50	
Latches only . "	.90	.90	

Knuckle.....per doz prs. $6 00
Leed's..... " sets 6 75
Superior..... " prs. 9 50
Screen Door.
Cast iron.....gross $6.65
Steel..... " 6.75
Spring.
Bommer.....50%
Chicago.....25&5%
Columbia Dbl. Acting..40&10&5%
Gem.....25%
Ideal Detachable.....per gro. $11
Matchless.....40%
New Idea.....per gro. $7 20
Oxford.....20%
Wrought Iron.
New Lists .....
Light Strap Hinges.....70&10%
Heavy Strap Hinges.....75%
Light T Hinges.....66⅔%
Heavy T Hinges.....45%
Extra Heavy T Hinges.....70%
Screw Hook and Strap.
6 to 12 in.....per 100 lbs. $4 25
14 to 20 in..... " " 4 00
22 to 36 in..... " " 3 75
Screw Hook and Eye.
½ in.....per 100 lbs. $6 75
⅝ in..... " " 7 75
¾ in..... " " 9 75

HOES.

Garden .....70&10%
Grub.
Extra.....70%
Hazel.....per doz. $5 00
Ladies' and Boys'.....70%
Mortar.....75&10%
Planter's Eye..... 62½%
Weed.....70&10%

HOLLOW WARE—See Ware.

HOOKS.

and Eyes.
Brass.....60%
Iron.....70%
Awning.....per gro. 80&10%
Belt.
Brown's.....70&5%
Jones'.....65&5%
Bench.
See Stops, Bench.

Box.
Inch..... 5 7 10 12
Per doz.....$1.90 2.10 2.25 2.65
Humason & Beckley's..per doz. $2 50
(See Goods, Bright Wire.)
Bush.
Common Axe Handle. per doz. $7 00
Chain.
Inch..... ¼&⅜ ½ ⅝ ¾
Per 100...$7.60-8.10 9.75 11.50 12.60
Clothes Lines.
Japanned .....per doz 22c@24c
Galvanized..... " 40c
Coat and Hat
Cast Iron .... per gro. 72c@$1 50
Gem Wire.....80%
Conductor.
Malleable.....25%
Wrought.....20%
Corn.
Common, rivetted, painted red.....per doz. $2 25
Little Giant..... " 3 25
Gate.
See Goods, Bright Wire.
Grass.
Common. Nos..... 2 3 4
Per doz.....$1.50 1.60 1.70
German.....per doz. 1 75
Gypsy..... " 2 50
Hammock.
With plate.....per doz. 50
With screw..... " 45
Lambrequin, or Drapery, per gro. .21c
Picture.....50% @50&10%
Potato and Manure.....66⅔%
Screw.
Brass.....85%
(See Goods, Bright Wire.)
Seat Spring.....per lb. 5½c

HOOPS, TUB.

Elastic ... per case of 2 doz.... $1 50

HOSE, GARDEN.

	Coupled, per ft.
Velvet, 3 ply-½" guar. press.....	7½c
Eclipse, " " "	9 c
Diamond " " "	11 c
Geneva " " "	14 c
Illinois " " "	20 c

COTTON COV. RUBBER HOSE.

High Grade-½"-guar. press. 400 lbs. 11½
Special " " " 300 " 9½c
Leader " " " 100 " 7½c

HUSKERS.

Boss.
Nos..... B BB E 200
Per doz.....$2.00 2.00 1.75 .80
Nos..... L PP P K
Per gro.....$5.40 6.00 6.00 10.50
Nos..... 2000 3000 O
Per gro.....$3.50 9.00 24.50
Nos..... 60 50 64 68
Per doz.....$2.15 2.15 .85 1.45
Brinkerhoff's.
Per gro.....$14 40

IRON.

See Metals.—First column.

IRONS.

Curling.
C.....per doz. $0 40
B..... " 50
A..... " 58
Princess..... " 70
Thelma..... " 1 25
Pinking..... " 70
Plane.
Wood Bench.....20&5%
Sad.
Charcoal.....per doz.$11 00
Common, polished, per 100 lb. 3 75
No. 70 Asbestos.....$1 20 net
No. 100 " ..... 1 35 net
Common, nickel plated, 5 25
Chinese Polishing.....per doz. 7 40
Laundry, No. 1..... " 5 75
Laundry, No. 2..... " 6 25
Mrs. Pott's,
No. 50 J. Enterprise, per set 93
No. 55 J. " " 90
No. 50 T. " " 1 00
No. 55 T. " " 96
Tailors' Sad.....per lb. 5½
Tailors' Geese..... " 5½
Tuyere.
Single Duck Nest.....per doz $5 25
Double Duck Nest.. " 6 25
Sutton.....each.... 2 60

JACKS.

Locomotive.....70%
Wagon.
Miller.....50%
Oliver,
Nos..... 0 00
Each..... $3.00 $5.00

Standard.
Nos..... 1 2
Each..... ...$0.60 1.00
Wilcox.
Nos..... 2 3
Each..... $0.85 1.20 2.90

KETTLES.

Brass.....15%
Cauldron.....40&5%
Copper..... per lb., 27c
Maslin.....65%
Sugar.....50%

KNIVES.

Beet Topping.
Clyde, 9-in. Scimiter Blade, doz.$3 85
California..... 3 40
Cooper's Hoop.....15%
Corn.
Clipper.....per doz. $1 75
Disston's..... " 2 75
Earle's..... " 3 00
Woodford..... " 2 25
Drawing.
Standard..... (New List)..50%
Adjustable.....15%
Barton's Carpenters' 10%
Folding Handle.....25&5%
Hay.
American, Sickle Edge...doz. $10 50
Canton, Sickle Edge..... " 8 25
Heath's..... " 8 00
Iwan's, Sickle Edge..... " 9 50
Iwan's, Impv'd Serrated . " 10 00
Lightn'g, Holt's Genuine. " 6 50
Lightning Pattern..... " 6 00
Wadsworth's Sp'r Point.. " 9 00
Hedge.
Challenge.....per doz. $6 00
Disston's..... " 3 75
Mincing.
Common, Single..... " 60
Common, Double..... " 90
Streeter, 4-Blade..... " 1 30
Streeter, 6-Blade..... " 2 00
Putty.
Common.....per doz. $0 60@1 00
Lander'r..... " 1 40@1 75
Scraping.
Beech Handle..... 75@1 00
Lander's..... 5 25@6 00

KNOBS.

Door.
Mineral.....per doz. $0 90
Porcelain..... " 1 00
Jet..... " 1 00

LADDERS.

Common Long
Per ft.....9c@14c
Extension.
Per ft.....14c
Step.
Common, per ft.....7½c
Common, with Shelf, add 10c.
Keystone.....15c
Triumph, per ft.....20c

LANTERNS.

Bull's Eye Police.
3 -in. Flash Light....per doz. $9 00
2½-in. Regular..... " 7 50
3 -in. Regular..... " 8 00
Tubular.
Dietz & Hams'.....net prices

LEADERS, CATTLE.

Nos..... 1 2 3
Per doz..... $0 55 .70 2.75

LEATHER, LACE.

Cut.....33⅓%
Sides.
Ex. Quality ..... per sq. ft., 27

LEATHERS, PUMP.

Valve and Plunger.....10%

LIFTERS.

Stove Cover.
Coppered.....per gro. 1 75@3 65
Ideal..... " 5 50
Alaska, Coppered " 4 00
Alaska, Nickeled. " 5 00
Transom.
Payson's.....80%

LINES.

Chalk.
Twisted in 20-ft. hanks.
Nos.... 4 6 7 8 9
Gross...$1.50 2 00 2 25 2 50 3 00
Twisted in 50-ft. balls.
Nos..... 1 2 3 4
Per doz.....25c 30c 35c 41c
Braided in 20-ft. hanks.
Nos..... 0 1 2 3
Per doz.....22c 25c 31c 35c
Mansons', in 100-ft. hanks...doz. 80c
Clothes
60-ft. Jute.....per doz. $0 95
72-ft. Jute..... " 1 15
60-ft. Sisal..... " 1 40
72-ft. Sisal..... " 2 15
50-ft. Cotton..... " 1 15
50-ft. Braided Cotton. " 25

LINING, STOVE.

Bricks.....per crate, 42c.

MACHINES.

Boring.	Without Augers	With Augers
Angular.....per doz.	3 00	4 40
Upright..... "	2 60	4 00

Leather Riveting.
Chicago, Pomeroy....per doz. $9 00
Excelsior..... " 2 00
Handy..... " 2 00
Little Giant..... " 3 00
Pony, Pomeroy..... " 7 20
Washing.
Majestic..... 5 25
Typhoon..... 6 00
P. P. V..... 6 50
Water Motor.....12 00

MAIL BOXES.

See Boxes.

MALLETS.

Carpenters'.
Fibre Head, Small....per doz. $5 00
" " Medium. " 5 75
" " Large... " 7 00
Round Hickory..... " 2 25
" Lignumvitæ... " 4 00
Square Hickory..... " 2 50
" Lignumvitæ... " 4 75
Tinners'.
Applewood..... " 1 70
Hickory..... " 1.00@1 50
Hickory Sheet Iron... " 1 50

MATS

Door
National Rigid.....50, 10&5%
Acme Steel Flexible.....33⅓%
Stove.
No. 2.....per gro. $3 25
No. 1..... " 3 50
No. 1 Asbestos Toasters, or wire-covered Stove Mats, with handle.....per doz. 1 10
No. 2 Asbestos Toasters, with ring.....per doz. 60

MATTOCKS.

Plumbs.....70%
Extra.....60%

MAULS.

Iron, lbs.....	10	13	16	18
Per doz....	$4.00	4.50	5.25	5.60
Wood face, lbs.....	10	12	14	
Per doz.....	$5.00	5.50	6.00	

Wood Choppers'.
Lake Super'r & Oregon Pat. 75&10%

MEASURES.

	½ pk.	1 pk.	½ bu.
Galvanized, per doz.	$2.25	3.00	3.85
Japanned.. "	1.75	2.45	3.15

MILLS, COFFEE.

Enterprise.....25%
Parker.....50&5%
Arcade.....40-12½&2½%

MITRE BOXES.

See Boxes.

MOPS.

Erie.....per doz. $3 15
Handled Cotton.
Pounds..... ½ 1 1½ 2
Per dozen....$2.00 2.35 2.65 3.25

MOWERS, LAWN.

Gladiator—B. B.
Inches..... 16 18 20
Each..... 6.50 7.25 8.00
King Universal—B. B.
Each..... 5.25 5.75 6.00
Inches..... 14 16 18
Big Giant..... 3.50 3.90 4.25
Little Giant..... 2.50 2.65 2.75

NAILS.

Cut Steel ..... rates, $2 00
Cut Iron..... 2 15
Wire.
Small Lots..... $2 00
Carload Lots..... 1 93
Cement Coated..... 1 80
Horse Shoe.
Ausable.....55&5%
Capewell.....15%
Perfect.....55&5%
Putnam.....20&5%
Star.....30-5%
Clover Leaf ..... per lb., net, 10½c
Picture.
Brass Heads.....25%
Brads.....85%
Screws.....30%

NAIL PULLERS.

See Pullers.

NAIL SETS.

See Sets.

NETTING, POULTRY.

Galvanized before weaving. 80, 20&5%
Galvanized after weaving....80&20%
Cut Pieces.....65&5%

NIPPERS.

End Cutting.
Stubb's Pattern. Inches 5 6
Per dozen..... $4.65 6.75
End and Diagonal Cutting.
Swedish Side. Inches 5 6
Per dozen..... $4 50 5 75
Hoof.
Heller's.....40&10%
V. & B.....55&5%

NOZZLES.

Hose.
Genuine Gem.....per doz. $3 90
Magic..... " 3 60
Mystic..... " 3 00

NUTS, HOT PRESSED.

Square Blank.
In ¼ ⅜ ½ ⅝ ¾ ⅞ 1
lb 9½c 8c 6½c 5½c 5c 4½c
Square Tapped.
In. ¼ ⅜ ½ ⅝ ¾ ⅞ 1
lb. 12½c 10½c 8c 7½c 6½c 6½c 6c
For 5-lb. boxes add ½c per lb. to above prices.

OILERS.

Chase Pattern.
Brass and Copper.....70%
Zinc.....60&10%
Engineers'.
Cannon.....35%
Tin .....per doz. $2 00@$2 25
Machine.
Common.....per doz. $0 58
Copper Plated Steel... " 1 00
Malleable Iron.....60%
Japanned.....65@75c

OPENERS.

Box.
Inches..... 12 14
Flat.....per doz. $5.50 6.00
Round..... " 3.50 3.80
Can.
Delmonico .....per doz $1 30
Never Slip..... " 65
Crate.
V. & B..... " 5 75

OUTFITS, COBBLING.

Combination.....per doz. 11 00
Economy..... " 4 65
Family..... " 9 75

PADLOCKS.

Eureka.....40, 10&5%
Yale.....60&5%

PAILS.

Cream.
14-qt., without gauge, per doz. $2 90
20-qt., " " " 3 45
20-qt., with gauge.... " 4 00
Sap.
10-qt., Galvanized, per 100....$17 00
12-qt., " " 23 50
14-qt., " " 23 75
16-qt., " " 30 00
10-qt.,IC Tin..... " 28 00
12-qt., " .... " 17 00
14 qt., " .... " 20 00
10-qt.,IX Tin.... " 16 00
12-qt., " .... " 20 00
14-qt., " .... " 22 00
Stock.
Galv'd, qts. 14 16 18 20
Per doz..... $3.90 4.10 5.00 5.50
Water.
Galvanized...qts. 10 12 14
Per doz..... $1 90 2 10 2 35
Wood.
Cable, 2-Hoop.....per doz. $1 90
Cable, 3-Hoop..... " 2 10
Cedar, 3-Hoop..... " 3 15
Standard, 2-Hoop.... " 2 00
Standard, 3-Hoop.... " 2 25

PANS

Dripping.....65%
Fry
Common .....75&10%
Acme 60%
Roasting.
Paxton,
Nos..... 1 2 3 4
Per doz.... $4.75 5.75 6.50 7.50
Neverburn .. 4.00 4.50 5.50 6.00
Savory, No. 200.....per doz. $8.00

PAPER.

Building.
Plain.....per 100 lbs. $1 25
Tarred..... " 1 35
Tarred Felt..... " 1 85
No. 20, Red Rosin....per roll. 35
No. 30, Red Rosin.... " 55
Sand and Emery.
Star ..... low list, 50%
B. & A.....50%
Wrapping.
Ivory .....per lb. $3 75
Rag..... " 2 25

PARERS.

Apple.
Bay State ..... per doz. $13 00
Turntable ..... " 7 00
White Mountain ..... " 5 00
Reading ..... " 7 00
Potato.
Goodsell's Saratoga, 10½ in., doz. 6 50
Goodsell's Saratoga, 5 in., doz. 5 50

PICKS.

Adze Eye Ore ..... 70&10%
Drifting and Poll Picks 70%
Plumbs, Railroad ..... 70&10%
Surface 70%

PINCERS.

Carpenters', cast steel,

Inches	6	8	10	12
Per doz	$2.00	2.60	2.95	3.75

Blacksmiths' 45%
Heller's 40%

PINS.

Clothes.
Common ..... per box of 5 gro $0 52
Hoyt's ..... " " 31
U. S. ..... " " 70
Picket.
Fluted, 15-in. ..... per doz. $1 00
Fluted, 21-in. ..... " 1 60
Spiral ..... " 1 90

PIPE.

Conductor.

	Gal. Steel	Charcoal
L. C. L. to Dealers:—		
Eastern	70&10%	50&10&2½%
Pittsburgh	75&10&5%	60%
Central	75&10%	60%
Northwestern	75&7½%	60%
Western	70&12½%	50&12½%
Tennessee	70&10%	50&12½%
Southern	70%	50&12½%
Southwestern	70%	50&5%

Terms 60 days; 2% Cash 10 days.
Factory shipments generally delivered.

Lead.
Full coils ..... per lb. 7¼c
Cut coils ..... " 7¾c
Stove

Acme—Inches	5	6	7
Smooth, per jt	8 c	8½c	10½c
Planished, "	30 c	31 c	38 c
Peerless—Smooth, 7½c	8 c	9½c	
Polished	14½c	15½c	18 c

Planished	28 c	31 c	35½c
Made-up—Inches	5	6	7
Smooth	7½c	8 c	9½c

7 to 6 in. Smooth Tapers, pr. jt. 11c
6 in. Smooth T's ..... " 27c
7 to 6 in. Planished Tapers 45c

Yale Patent Lock Pipe—Stove.

	5"	6"	7"	7" to 6"
	Cents			
Battle Axe Blue	7	7½	9½	10½
Can't Slip "	7½	8½	10	11
Peerless "	7½	8½	10	11
Duplex "	10	11	13	14
Yale, Rus. Fin	15	16	17	18
Duplex Planished	29	31	37	38
Galvano, Gal	15	16	17	18

If wanted made up, add per joint or grooved, 1c; riveted, 1½c. Grating made-up pipe extra.

Wrought Iron Gas Pipe.
¼@½-in., black ..... discount, 60%
¼@½-in., black ..... " 60,10&5%
¾-in. to 6-in., black ..... " 70%
7-in. to 12-in., black ..... " 62½%
¼@½-in., galvanized ..... " 42%
¾@1-in., galvanized ..... " 50%
1¼-in. to 6-in., galvan'd " 57½%
7-in. to 12-in., galvan'd " 45%

PLANES

Sargent Iron Bench 60%
Stanley Iron Bench ..... Nets

PLATES, TIN.

See Metals in Column 1.

PLIERS.

Giant, Button's—80% off list.
Cutting
Bernard's 30%
Lodi 50%
Upper End and Diagonal Cutting
Swedish Side 70%
Utica Drop Forge & Tool Co. ..... Net
Fencing.
Black Bull ..... per doz. $8 25
Farmers' Choice ..... per doz. $8 00
Russell's ..... " 8 25
Flat and Round Nose.
Bernard's 30%
German 65%
Lodi 50%
Paragon 50%
Gas.—Inches

	7	8	10	12
Per doz	$3.00	3.50	4.50	5.50

Tinners'.
Hollow 40%
Solid ..... each, 5½c

PLUMBS AND LEVELS

Common ..... Nets
Cook's 40%
Davis' Iron 25%
Davis' Inclinometer 15%

POINTS

Drive Well Points ..... 75&5%

POKERS, STOVE

Wr't Steel, str't or bent, per doz. $0 55
Wr't Steel, wood hand'ls " 80
Nickel Plated, coil hand'ls " 65

POKES, ANIMAL

Cracker Jack, wr't steel, per doz. $4 50

POLISH.

Metal.
Black Silk, No. 50, ¼-gallon per doz. $7 00
Black Silk, No. 60, 6-oz. cans, per doz. 1 00
Black Silk, No. 70, 1-pt. cans, per doz. 2 25
Black Silk, No. 80, 1-quart, per doz. 3 75
Black Silk, No. 90, 1-gallon, per doz. 12 00
Shoe.
M. C. D. ..... per doz. ..... 36c@50c
F. C. O. ..... " 40c
T M. ..... " .55c@$1 75
Imperial ..... per gro 5 00
Stove.
Black Eagle, 1-lb. cans, pr. gr. $15 00
Black Silk—
5-lb. pail $0 70
Paste, 5-oz. cans ..... per doz. 75
Paste, ½-lb. cans ..... " 1 00
Liquid, ½-pt. cans ..... " 1 00
Liquid, 6-oz. cans ..... " 75
½ pt. Air Drying Iron Enamel ..... " 1 25
Black Jack, ½-lb. cans. " 9 25
Dixon's Carb. of Iron. " 5 75
Nickel Plate ..... " 4 50

POPPERS, CORN.

Round or Square, 1-qt. per doz. $1 00
Square, 2-qt ..... " 1 60
4-qt ..... " 3 00

POTS, FIRE.

Clayton & Lambert's, each, $4 00@6 00
Gate City ..... each, 6 25
Gem ..... each, $6 75@8 50

POWDER.

See Ammunition.

PRESSES, FRUIT AND JELLY.

Enterprise Manufacturing Co. 25%

PRIMERS

See Ammunition.

PRUNERS.

Disston's Pole ..... per doz. $6 50
Henry's Improved ..... " 75&10%
Water's Improved ..... " 80%

PULLERS.

Cork.
Daisy ..... each, $3 10
Phœnix ..... " 1 40
Quick and Easy ..... " 2 70
Nail.
Giant ..... per doz. 10 80
Giant Pattern ..... " 9 00
Jumbo ..... " 9 00
Tack—Giant ..... " 40

PULLEYS.

Awning—Jap'd 60%
Clothes Line ..... 50&10%
Hay Fork.
Iron Wheel, 5-in. ..... per doz. $1 75
Wood Wheel, 6-in. ..... " 1 80
Wood Wheel, 6-in., pass knot, ... per doz. 2 55
Hot House—Jap'd ..... 50&10%
Screw—Jap'd 60%
Side—Jap'd ..... 50&10%
Sash.
Common ..... per doz. $0 18
Common-Sense, 2-in. " 20
Empire Pattern, 2-in. " 20
Ideal ..... " 20
Steel ..... " 25

PUMPS.

Pitcher Spout.

Nos	1	2	3	4
Each	$1.00	1.15	1.30	1.70

Spray.
Blizzard ..... per doz. $14 50
Cyclone, tin ..... " 3 40
Cyclone, copper ..... " 6 75
Daisy ..... " 9 00
Little Giant ..... each, 2 25

PUNCHES.

Conductors'.
No 22 ..... per doz $2 25
Machine ..... per lb 19
Saddlers'.
Common ..... per doz 60c@70c
Good ..... " 72c@84c

PUTTY.

In Bladders.
Strictly pure ..... per 100 lbs. 3 00

RAIL.

Barn Door.
Matchless, 1-in ..... 3 c
Matchless, 1¼-in 3½c
Storm King ..... 4 c
Sliding Door.
Painted steel ..... per ft. 4½c
Bronzed wrought iron ..... per ft. 8½c

RAKES.

Coal or Wood ..... per doz. $5 20
Garden.
Steel 70%
Steel, bow 70%
Malleable iron, heavy ..... 60&10%
Hay.
Wood ..... $1 80@$2 00
Lawn—Wood.
XXX ..... per doz. $3 00
Automatic ..... " 5 25
Lawn Queen ..... " 2 75
Jumbo, 36 teeth ..... " 6 00

RASPS—See Files.

RAZORS.

Bo-ras-ic 50%
Red Devil 50%
Star 50%
Tree Brand 50%

RAZOR STROPS.

Star (Honing) 50%

REGISTERS.

(All Sizes)

Japanned, Bronzed and Plated 75%
White Porcelain Enameled 65%
Solid Brass and Bronze Metal 40%
Single Valve (Baseboard and Sidewall) 70%

REGISTER FACES

Japanned, Bronzed and Plated
4x6 to 14x14 ..... 75%
14x14 to 38x42 ..... 75&10%
Heavy Round Gratings ..... 75&10%
White Porcelain Enameled ..... 50&10%
Solid Brass or Bronze Metal 40%

RINGS.

Bull.

Copper	2½ in.	3 in.
Per doz	$1 60	$2 00
Rea's Improved Self-Piercing copper, pr doz	2 00	....
Steel, per doz	90	1 00
Nickel plated	1 35	....

and Ringers—Hog.

Blair's Rings	per doz.	$0 58
Blair's Ringers	"	75
Brown's Rings		50
Brown's Ringers	"	80
Champion Ringers	"	1 60
Hill's Ringers	"	70
Hill's Ring, boxes	"	55
Major Rings	"	60
Perfect Ringers	"	1 20
Wolverine Rings	"	1 40
Wolverine Ringers	"	80

Fruit Jar.
White ..... per lb 30c
Key.
Split, round ..... per doz. $0 17
Split, square ..... " 32
Ball, round ..... " 40

RIVETS.

and Burrs.
Copper Belt 40%
Coppered Iron ..... 60&10&5%
Tinners' 70%
Hame ..... per lb. $0 10
Slotted Clinch per doz 40c@45c
Tubular
Nos 1 and 2 assorted sizes, doz. 45c

RIVET SETS

See Sets.

ROPE.

Cotton.
¼, 5-16 in. Com on reels. per lb. 11½c
¼, 5-16 in Com. in coils. " 12 c
¼, 5-16 Imperial in coils. " 21 c
Sisal.
1st Quality ..... 11 c
Hardware Grade, rates, per lb. 10½c
Pure Manila.
1st quality ..... per lb. 14 c
Hardware Grade, rates ..... " .12½c

RULES.

Boxwood ..... Nets
Ivory ..... Nets

SASH WEIGHTS.

See Weights.

SAWS.

Back.
Atkins' 30%
Disston's 25%
Jackson's 25%
Butchers'.
Atkins' ..... 40&10%
Disston's 30%
Circular.
Atkins' 50%
Disston's 50%
Hiles' ..... 50&10%
Simonds 50%
Compass.
Atkins' 35%
Common ..... per doz $1 35@1 60
Disston's 25%
Cross-Cut
Atkins' 35%
Disston's 45%
Simonds 30%
Dehorning.
Atkins' ..... per doz. $5.75
Disston's ..... per doz. $5 75
Grooving
Atkins' 50%
Hack.
Atkins' 30%
Disston's 25%
Simonds 50%
Star 25%
Hand and Rip.
Atkins' 35%
Disston's No. 7 ..... 30%
Disston's Nos 8, D8, 12, 76, 112, D100, and 120 (new list) 25%
Keystone 30%
Enterprize, hand ..... per doz. $5 00
Our Saw, hand ..... " 4 00
Our Saw, rip ..... " 4 50
Keyhole—Disston's 25%
Atkins' 35%
Narrow Band
Atkins' 50%
Simonds 30%
One Man 40%
Atkins' 40%
Panel
Atkins' 35%
Disston's No. 7 ..... 30%
Pruning.
Atkins' 30%
Disston's 25%
Rift
Atkins' 50%
Simonds 45%
Wood
Common ..... per doz. $4 50
Clover Leaf ..... " 6 00

SAW BUCKS—See Bucks.

SAW SETS—See Sets.

SAW TOOLS—See Tools.

SAW FRAMES.

Common, plain ..... per doz. $1 25
Common, painted ..... " 1 70

SCALES.

Counter.
Pelouze ..... 40&10%
Platform.
Osgood 50%

SCISSORS.

Star 60%

SCOOPS.

Grain.
¼-bu. "Hercules" ..... per doz. 13 70
1-bu. "Hercules" ..... " 15 00

SCRAPERS.

Box.
Triangular ..... per doz. $4 00
Cabinet.
Cast Steel ..... per doz, 60c@75c
Road.

Cubic ft.	7	5	3
Without run's, ea.	$4.00	3.75	3.50
With runners, ea.	4.25	4.00	3.75

SCREEN DOOR HINGES.

Cast iron ..... gross $6.65
Steel ..... " 6.75

SCREWS.

Bench.

Iron, in	1	1¼	1½
	$3.50	4.00	5.00

Wood, white maple ..... per doz. $3 50
Hand—Wood ..... 70% new list
Hand Rail 70-10%
Jack 70-10%
Lag or Coach—all sizes, gimlet pointed 75%
Saw—Centennial

Nos	1	2	3	4	5	6
Per doz.	18c	20c	26c	30c	23c	25c

Wood.
F. H. Bright ..... 87½&5&10%
R H Blued ..... 85&5&10%
F. H. Jap'd ..... 82½&5&10%
F. H. Brass ..... 80&5&10%
R. H. Brass ..... 77½&5&10%
R. H. Nickel Plated ..... 77½&5&10%

SCYTHES.

Be Ve Be, grass ..... per doz. $8 00
Clipper, grass ..... " 8 25
Clover Leaf Dutchman ..... " 7 50
Honest Dutchman ..... " 7 50
Be Ve Be ..... " 7 50

SHAVING SETS

Smith & Hemenway 60%

SETS.

Nail.
Round, common.....per doz. $0 33
Square, common..... " 42
Octagon, common.... " 33
No. 5, square..... " 75
Cup point, knurled... " 75
Rivet.
Farmers'.....per doz. $1 20
Tinners'..... 50%
Saw.
Aiken's Pattern.....per doz $3 50
Common Lever..... " 1 20
Disston's Monarch.... " 6 50
Disston's X Cut ..... " 12 00
German..... " 1 50
Leach's..... " 80
Nash's Hand..... " 3 15
Nash's X Cut..... " 4 20
Stillman's Lever..... " 1 30
Stillman's X Cut..... " 2 50

SHARPENERS, SKATE.

Diamond.....per doz $1 60
Smith & Hemenway 20%

SHAVES, SPOKE

Iron.....per doz $1 10@1 85
Wood ..... " 2 75@4 75
Bailey's ..... 50&5%
Goodell's 15%

SHEARS

Pruning
Buckeye, No. 1.....per doz $5 75
Buckeye, No. 2..... " 7 40
California Pat., 9-in.. " 3 20
California Pat., 10-in.. " 4 00
Draw Cut, No. 3..... " 13 75
Draw Cut, No. 4..... " 16 50
Henry's Pat. 0 01 14 012
Per doz.....$1.40 2.10 2.90 2.80
Star.....per doz $4 00
Sheep—No BBA.
Inches..... 6 6½ 7
Reg. Grip.....$11.25 11.50 12.00
Nar. Grip, doz.... 11.00 11.25 12.25
Star 60%
Tinners'—See Snips.

SHEAVES, SLIDING DOOR.

Common.
Inches..... 3 4 5
Per set..... $0.50 .65 .90
Hatfield's.
Per set..... $0.80 1.10 1.80

SHELLS—See Ammunition.

SHELLERS, CORN.

Union.....per doz. $6 75

SHIELDS.

Expansion Bolt Shields.....50&10%

SHOES.

Conductor.....60&10%

SHOT—See Ammunition.

SHOVELS AND SPADES.

Coal.
No 2 Woodford.....per doz. $5 50
No. 182... " 6 00
Ames' new list .....Discount, 12½%
Per doz.
Neverbreak, hollow bck, blk. $15 75
National.... " " " 14 75
Buckeye.... " " " 10 00
Mohawk.... " " " 9 60
Drain.
Iwan's Perfection.....50%
Railroad, etc.
Black Diamond.....per doz. $12 50
Crescent..... " 5 75
Keystone..... " 8 75
Star..... " 4 75
Vaterland..... " 9 50
Hollow Back..... " 4 50
Ames, new list.....Discount, 12½%
Snow.
Per doz.....$1.65@$9.00
Alaska Steel.
D Handle.....per doz. $3 50
Long Handle..... " 3 00

SINKS.

Cast Iron.
Painted.....50&10%
Enameled, White.....50&10%
Wrought Steel.
Painted, new list.....40-10&5%

SLEDGES—See Hammers.

SNAPS, HARNESS.

Champion.....33⅓%
German Pattern.....30&5%
Judd's Pattern.....60%

SNATHS.

Double Ring, Bush.....per doz. $6 50
Patent Loop, Bush..... " 7 00
Patent Loop, Grass..... " 6 00

SNIPS, TINNERS'.

Clover Leaf.....40&10%
National.....40&10%
Star.....50%

SOLDER—See Metals.

SPRINGS, DOOR.

Perfect.
Nos..... 1 2 3 4
Per doz.....30c 35c 40c 54c
Reliance.
Per doz ... light, $1.15; heavy, $2 50
Star.
Per doz .... light, 90c; heavy, $1 35
Torrey's.....per doz. $1 20
Warner's No..... 11 13
Per doz..... 75c $1 35

SQUARES.

Steel and Iron.....40% New List
(Add for bluing, $2.50 per doz., net.)
Mitre.
Try.
Try and Bevel.
Try and Miter.
} Nets
Fox's.....per doz. $6 00
Winterbottom's.....70%

SQUEEZERS, LEMON.

Common Wood.....per doz. $0 70
Porcelain Lined, Wood.. " 1 25
Boss, malleable iron.... " 1 20
Iron Frame, porc'n bowl " 1 90
Iron Frame, glass bowl . " 2 35
Little Giant, tin'd iron . " 4 00
Drum, japanned..... " 3 60
Drum, nickel plated ... " 4 50

STAPLES

Blind.
Barbed.....per lb . . .9½@9½c
Butter Tub..... " .....8 @8½c
Fence—less than carload.
Polished.....per 100 lbs. $2 10
Galvanized..... " 2 35
Netting.
Galvanized.....per 100 lbs. 4 00
Wrought.
Wrought Staples, Hasps and Staples, Hasps, Hooks and Staples, and Hooks and Staples..... 80-10&10%
Extra heavy.....75&10%

STEELYARD.

Discount 25%.

STONES.

Axe.
Hindostan.....per lb 5½@7 c
More Grit..... " 9½c
Washita ..... " 38 c
Emery.....60%@60&5%
Oil—Mounted.
Arkansas Hard.....per doz.$23 00
Arkansas Soft..... " 15 50
Hindostan .....per lb 6½@6½
Oil—Unmounted.
Arkansas Hard.....per lb $2 40
Arkansas Soft ..... " 1 20
Lily White..... " 40
Queer Creek..... " 15
Ouachita..... " 38
Washita..... " 40
Scythe.
Black Diamond.....per gro. $8 00
Crescent..... " 4 25
Gem Corundum..... " 7 50
Green Mountain..... " 4 50
La Moille ..... " 7 00
Quinnebog..... " 6 00
Red End ..... " 3 75

STOPS, BENCH.

Hotchkiss'.....per doz. $3 50
Stearns'..... " 4 00

STOPPERS, FLUE.

Common.....per doz. $0 40
Crown..... " 45
Gem, flat, painted..... " 85
Gem, cor'd, decorated... " 70
Kirch's..... " 90
Perfect..... " 70@85
Skinner's Common Sense " 80

STOVE PIPE—See Pipe.

STOVE BOARDS—See Boards

STOVE POLISH—See Polish.

STRAPS.

Scoop.....per doz prs., $1 80
Skate..... " " 60@70

STRETCHERS.

Carpet.
Bullard's.....per doz. $3 90
Excelsior..... " 5 25
Malleable Iron..... " 70
Perfection..... " 6 30
King..... " 4 50
Wire.
N. S. Elwood's.....per doz. $6 00
O. S. Elwood's..... " 6 00
Little Giant..... " 5 75
Safety..... " 10 00
Star Lever..... " 6 25
Canton Tackle Block. " 9 50
Warner's ..... " 6 25

SWIVELS.

Malleable Iron.....per lb. $0 70
Wrought Steel.....per gro. 4 50

TACKS.

American Cut.....90&15%
American Wire.....85&20%
Bill Posters Cut.....90&50%
Blued Carpet.....90&10%
Tinned Carpet.....90&10%
Gimp.....90&10%
Upholsters' Cut.....90&40%
Upholsters' Wire.....90&10%
Double Pointed.....90%
Copper.....per lb. 34c
Canvas Nails.....70%
Clout Nails.....70-5%
Hungarian Nails.....75%

TAPES, MEASURING.

Asses' Skin.....40&10%
Bend Leather.....20%
Patent Leather.....20%
Lufkin's Steel.....25%
Lufkin's Metallic.....30%

TEE BEVELS—See Bevels.

THERMOMETERS.

Tin Case.....per doz. 80c@$1 25
Wood Back..... " $2.00@12 00
Glass..... " 12 00

TIES.

Bale.
Single Loop.....80&5%
All other kinds.....70%
Cow—See "Chains."

TOOLS, SAW.

Disston's Universal.....40%
Miniatures.
Smith & Hemenway 25%

TRAPS.

Sargent's Game.
10—11—11½ 75%
72—73—74 .....70&5%
32—33—34 .....70&10%
Mole.
Reddick's.....per doz. $6 00
Mouse and Rat.
Holdem Mouse.....$2 25
Holdem Rat..... 4 00
Sure Catch Mouse..... 30
Sure Catch Rat..... 75
Delusion Mouse..... 90

TROWELS.

Brick.
Clover Leaf.....30%
Brade's.....15&5%
Disston's.....30%
Rose's.....20%
Plasterers.
Clover Leaf.....40%
Disston's.....25%
W. & McP.....25%

TRUCKS.

Bag .....each $2 75
Warehouse..... 50&10%
No. 1 2 3
Half Ironed.....$3 00 3 85 5 50
Full Iron 3 45 4 50 6 45

TUBS, WASH

Standard, Wood. Ex.
Nos..... 3 2 1 large
Per doz.....$5.00 6.00 7.00 9.50
Dowell.
Per doz..... 5.35 6.35 7.00 9.50
Cedar.
Per doz..... 6.10 7.10 7.90 10.80
Indurated.
Per doz..... 8.55 9.45 10.80 13.50
Galvanized.
No..... 1 2 3
Per doz.....$5.25 6.00 7.00

TWINE.

Per lb.
3-ply Cotton Wrapping 28c
4 " " " 28c
4 " Extra Wrapping.....27c
4 " " " Hvy. Wrapping 25c
4 " Wrapping on tubes....27c
3 " " " cones.: ..25c
4 " " " " " 25c
India Hemp, ½-lb. balls 21c
" " ½-lb. " 20c
" " ¼-lb. " .....doz. 75c
2-ply Jute, ½-lb. " 16c
3-ply Jute, ½-lb. " 15c
Jute Wrapping, ½-lb. balls.....14c
Jute Wool, 1-lb. balls.....9½c
Seins.
Nos... ..... 9 12 15
Soft.....per lb 32 31 30
Med..... " 32 31 30
Hard..... " 38 34 33
Staging, ½-lb. ball, size 21.....26½c
" " " " 24.....26½c
" " " " 27.....26½c
Bagging " " 23c
3-p y "B" in hanks 18c
4- " "B" " 18c
3 " "A" " 27c
3 " Silver Finish, in hanks...37c
Fodder or Lath.
130 strand.....6½c
200 strand.....—c

VISES.

Phœnix.....30%
Phœnix Oval Slide,
Inches..... 2½ 3 3½ 4½
Each..... $1.25 1.50 1.85 2.75
Parker's Parallel..... 20%
Parker's Victor..... 20%
Parker's Swivel Base..... 20%
Parker's Re-inforced 20%
Parker's X Series..... 20%
Parker's Combination 20%
Solid Box.....40&5%
Williamson's Universal.....60%

WARE.

Stove Hollow Ware.
Plain or Unground.....50%
Ground Ware..... .....45%
Enameled Ware.....33⅓%
Scotch Bowls.....60&5%
Country Hollow Ware, per 100 lbs. $3 00
White Enameled Ware.
Maslin Kettles.. .....60&10%
Neverbreak Flat and Round Bottom Kettles .....60&5%
Covered Ware.
Tin'd and Turn'd.....35&10%
Enameled.....45&10%
Glue Pots.
Tinned.... .....25%
Enameled.....30%
Enameled.
Cherry Blossom and Chrysolite..60%

WASH BOARDS—See Boards.

WASHERS.

Standard O G. cast iron . . .per lb. 2½c
Wrought iron in bulk, per lb.:
In. ⅛ ¼ ⅜ ½ ⅝ ¾ 1
9c 6½c 5c 4½c 4½c 4½c 3½c
Wrought steel in 5-lb. boxes, per lb.:
In. ⅛ ¼ ⅜ ½ ⅝ ¾ 1
10 7c 6c 5½c 5c 5c 4½c

WEDGES.

Axe.....per doz. $0 30
Galling.....per lb. 10½
Saw..... " 8½

WEANERS.

Calf.
Fuller's, per doz.....$2 00 to $2 50
Tyler's Safety, per doz 1 85 to 2 40
Carroll's, per doz..... 3 00 to 3 75
Hoosier, per doz..... 3 50 to 4 60
Shaw Perfected..... 3 00 to 3 75

WEIGHTS.

Hitching.....per lb. 2½c
Sash—f.o.b Chicago....pr ton. 24 00

WHEEL BARROWS.

Common Railroad.....per doz. $17 00
Heavy Railroad..... " 24 00
Panama Steel Tray.... " 30 00
Klondike Steel Tray.. " 28 00

WHEELS.

Corundum.....70&10&5%
Emery.....75&5%
Well. Inches.. 8 10 12 14
Per doz..... $2.40 3.25 4.00 15.00

WIRE.

Barbed. Painted. Galv'd
Carloads .. per 100 lbs.$1 92 $2 33
Less than car " 2 00 2 40
Brass.
In coils.....20%
In 1-lb. spools, new list.....50%
Broom—Tinned . . . 60&10&10&10%
Cable—Same price as Barbed Wire.
Copper.
In coils.....20%
1-lb. spools, new list.....50&10%
Fence—Smooth.
Nos. 6 to 9, An'eal'd, pr 100 lbs.$1 90
Nos. 6 to 9, Galv'd.. " 2 30
Hair—New List..... 60%
Market.
Bright, full bdles.....70&5%
Bright, broken bdles.....70%
Coppered, full bdles.....70%
Coppered, broken bdles.....65&10%
Tinned, full bdles.....75&5%
Tinned, broken bdles.....65&10%
Picture—In coils . . . 80% @80&10%
In 5-lb. spools.....per lb 26c
Plain—Small lots..... $2 10
Car lots..... 2 05
Small spools 5c per 100 higher.

WRENCHES.

Acme Standard..... 50&10%
Alligator No. 1 .....90cnet
Always Ready..... 50%
Agricultural.....75&5%
Ellis Adjustable.....25%
Malleable "S".....per lb. 08c
Malleable..... " 06c
Stillson Pipe.....70&10%
Bemis & Call's:
Adjustable S, 40&5%; Adjustable S Pipe, 40&5%; Briggs Pattern, 40%; Combination Bright, 50%
Steel Handle Nut.....50&5%
Combination Black.....50&5%
Merrick Pattern.....50&5%
Double End Adj. S.....40&5%

WRINGERS.

No. 500, Royal.....per doz, 38 50
No. 350, Universal..... " 33 00
No 300, Novelty..... " 33 00
No. 310, Keystone... . " 33 00
No. 100, Rival..... " 27 50
No. 380E, Universal.. " 38 00
No 790, Guarantee ... " 43 50
No 770, Bicycle ..... " 38 00
No. 110, Guarantee.... " 38 50
No. 110, Domestic..... " 33 00
No. 110, Brighton..... " 27 50
No. 740, Bicycle..... " 38 00
No. 22, Guarantee.... " 38 50
No. 22, Domestic..... " 33 00
No. 22, Pioneer..... " 27 50
No. 2, Superb ..... " 25 00

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Friedly-Voshardt Co., Chicago, Ill.
Hussey & Co., C. G., Pittsburgh, Pa.
Milwaukee Corrugating Co., Milwaukee, Wis.
Wheeling Corrugating Co., Wheeling, W. Va.

Cooking Utensils.
Avery Stamping Co., Cleveland, O.

Cornices.
Berger Mfg. Co., Canton, O.
Canton Art Metal Co., Canton, O.
Friedley-Voshardt Co., Canton, O.

Cornice Brakes.
Bertsch & Co., Cambridge City, Ind.
Niagara Machine & Tool Works, Buffalo, N. Y.
Robinson Mfg. Co., J. M., Cincinnati, O.

Crimping Machines.
Bertsch & Co., Cambridge City, Ind.
Niagara Machine & Tool Works, Buffalo, N. Y.
Robinson Mfg. Co., J. M., Cincinnati, O.
Stoll Co., The D. H., Buffalo, N. Y.

Culvert Machinery.
Bertsch & Co., Cambridge City, Ind.
Stoll Co., D. H., Buffalo, N. Y.

Cutlery.
Smith & Hemenway Co., New York, N. Y.

Cut-offs—Rain Water.
Milwaukee Corrugating Co., Milwaukee, Wis.
Sullivan-Geiger Co., The, Indianapolis, Ind.

Dampers.
Howes Co., S. M., Boston, Mass.

Dies.
Kidder Mfg. Co., J. F., Burlington, Vt.
Stoll Co., D. H., Buffalo, N. Y.

Eaves Trough.
Berger Bros. Co., Philadelphia, Pa.
Berger Mfg. Co., Canton, O.
Canton Art Metal Co., Canton, O.
Milwaukee Corrugating Co., Milwaukee, Wis.
Wheeling Corrugating Co., Wheeling W. Va.

Elbows—Conductor Pipe.
Milwaukee Corrugating Co., Milwaukee, Wis.

Elevators.
Kimball Bros. Co., Council Bluffs, Ia.

Enameled Ware.
Avery Stamping Co., The, Cleveland, O.

Facings.
Dixon Crucible Co., Jos., Jersey City, N. J.

Fence—Iron.
Cincinnati Iron Fence Co., Cincinnati, O.

Fence Stays.
Worth Wire Works, Kokomo, Ind.

Fencing—Wire.
American Steel & Wire Co., Chicago, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.

Files.
Delta File Works, Philadelphia, Pa.
Heller Bros. Co., Newark, N. J.

Food Choppers.
Enterprise Mfg. Co. of Pa., Philadelphia, Pa.
Smith & Hemenway Co., New York, N. Y.

Furnaces—Hot Air.
American Furnace Co., St. Louis, Mo.
Boynton Furnace Co., Chicago, Ill.
Co-Operative Foundry Co., Chicago, Ill.
Forest City Fdy. & Mfg. Co., Cleveland, O.
Haynes-Langenberg Mfg. Co., St. Louis, Mo.
Henry Furnace Co., T. E., Cleveland, O.
Kelsey Heating Co., Syracuse, N. Y.
Majestic Furnace & Fdy. Co., Huntington, Ind.
Meyer Furnace Co., Peoria, Ill.
Monroe Fdy. & Furn. Co., Monroe, Mich.
Peck-Hammond Co., Cincinnati, O.
Robinson Furnace Co., Chicago, Ill.
Scheible, Moncrief Heater Co., Cleveland, O
Schwab, R. J. & Son Co., Milwaukee, Wis.
Smith, Chas., Chicago, Ill.
Smith Co., Chas., Chicago, Ill.
Sprague Fdy. & Mfg. Co., Council Bluffs, Ia.
XXth Century Heating & Vent. Co., Akron, O.
Union Stove Works, New York, N. Y.
Wise Furnace Co., Akron, O.
Wrought Iron Range Co., St. Louis, Mo.

Furnace Pipe and Fittings.
Michigan Safety Furnace Pipe Co., Detroit, Mich.

Furnace Rings.
Walworth Run Foundry Co., Cleveland, O.

Furnaces—Soldering.
Berns, Otto, Newark, N. J.
Clayton & Lambert Mfg. Co., Columbus, O.
Diener Mfg. Co., Geo. W., Chicago Ill.
Ringen Stove Co. St. Louis Mo.

Furnace Repairs.
Brauer Supply Co., A. G., St. Louis, Mo.

Furnaces—Tinner's.
Berns, Otto, Newark, N. J.

Gates.
Pittsburgh Steel Co., Pittsburgh, Pa

Grease—Graphite.
Dixon Crucible Co., Jos., Jersey City, N. J.

Griddles.
Avery Stamping Co., Cleveland, O.

Hardware Jobbers.
Bullard & Gormley Co., Chicago, Ill.
Clark, Smith Hdw. Co., Peoria, Ill.

Handles—Sad Iron.
Universal Stamping & Mfg. Co., Cleveland, O.

Hardware Specialties.
Avery Stamping Co., Cleveland, O.
Berger Bros. Co., Philadelphia, Pa.
Broadbelt Mfg. Co., Baltimore, Md.
Diener Mfg. Co., Geo. W., Chicago, Ill.
Enterprise Mfg. Co. of Pa., Philadelphia, Pa.
Foy Co., The E. A., Cincinnati, O.
Heller Bros. Co., Newark, N. J.
Hessler Co., H. E., Syracuse, N. Y.
Icy Hot Bottle Co., Cincinnati, O.
Lufkin Rule Co., Saginaw, Mich.
North Bros. Mfg. Co., Philadelphia, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Smith & Hemenway Co., New York, N. Y.
Stanley Rule & Level Co., New Britain, Conn.
Stuber & Kuck, Peoria, Ill.

Heaters—Combination.
Smith Co., Chas., Chicago, Ill.

Hollow Ware.
Avery Stamping Co., Cleveland, O.

Household Utensils.
Stuber & Kuck, Peoria, Ill.

Ice Cream Freezers.
North Bros. Mfg. Co., Philadelphia, Pa.
Smith & Hemenway Co., New York, N. Y.

Iron Enamel.
Black Silk Stove Polish Works, Sterling, Ill.
Nickel Plate Stove Polish Co., Chicago, Ill.

Kettles.
Avery Stamping Co., Cleveland, O.

Kitchen Utensils.
Stuber & Kuck, Peoria, Ill.

Lard Presses.
Enterprise Mfg. Co. of Pa., Philadelphia, Pa.

Latches—Gate.
Broadbelt Mfg. Co., Baltimore, Md.

Laundry Heaters.
Kellogg, Mackay Co., Chicago, Ill.

Lawn Mowers.
Philadelphia Lawn Mower Co., Philadelphia, Pa.

Lightning Rods.
Foy Co., The E. A., Cincinnati, O.

Linemen's Tools.
Smith & Hemenway Co., New York, N. Y.

Machinery—Special.
Stoll Co., D. H., Buffalo, N. Y.

Metal—Perforated.
Harrington & King Perforating Co., Chicago, Ill.

Metal Polish.
Black Silk Stove Polish Works, Sterling, Ill.
Nickel Plate Stove Polish Co., Chicago, Ill.

Metal Shingles.
Canton Art Metal Co., Canton, O.
Milwaukee Corrugating Co., Milwaukee, Wis.
National Sheet Metal Roofing Co., Jersey City, N. J.
Wheeling Corrugating Co., Wheeling, W. Va.

Mica.
Brauer Supply Co., A. G., St. Louis, Mo.
Munsell Co., Eugene, New York and Chicago.

Miters.
Friedly-Voshardt Co., Chicago, Ill.
Milwaukee Corrugating Co., Milwaukee, Wis.

Motors—Water.
Smith & Hemenway Co., New York, N. Y.

Ornaments—Sheet Metal.
Canton Art Metal Co., Canton, O.
Friedley-Voshardt Co., Chicago, Ill.
Gerock Bros. Mfg. Co., St. Louis, Mo.

Ovens—Gas & Gasoline.
Howes Co., S. M., Boston, Mass.

Paint—Silica—Graphite.
Dixon Crucible Co., Jos., Jersey City, N. J.

Plumbago.
Dixon Crucible Co., Jos., Jersey City, N. J.

Plungers.
Berger Bros. Co., Philadelphia, Pa.

Presses.
Stoll Co., D. H., Buffalo, N. Y.

Punches.
Bertsch & Co., Cambridge City, Ind.
Kidder Mfg. Co., J. F., Burlington, Vt.
Niagara Machine & Tool Works, Buffalo, N. Y.
Robinson Mfg. Co., J. M., Cincinnati, O.
Stoll Co., D. H., Buffalo, N. Y.
Weiss & Co., H., New York, N. Y.

Radiators.
Rochester Radiator Co. Rochester, N. Y.
Kellogg-Mackay Co., Chicago, Ill.

Rasps.
Delta File Works, Philadelphia, Pa.
Heller Bros. Co., Newark, N. J.
Smith & Hemenway Co., New York, N. Y.

Registers.
Henry Furnace Co., T. E., Cleveland, O.
Schwab, R. J., & Sons Co., Milwaukee, Wis.
Symonds Register Co., St. Louis, Mo.
Walworth Run Fdy. Co., Cleveland, O.
Waterloo Register Co., Waterloo, Ia.

Roasters.
Wheeling Corrugating Co., Wheeling, W. Va.

Rolls Forming.
Bertsch & Co., Cambridge City, Ind.
Niagara Machine & Tool Works, Buffalo, N. Y

Roofers' Supplies.
Auld & Conger Co., Cleveland, O.
Berger Bros. Co., Philadelphia, Pa.

Roof Flanges.
Hessler Co., H. E., Syracuse, N. Y.

Roofing—Iron and Steel.
American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Pittsburgh, Pa.
Berger Bros. Co., Philadelphia, Pa.
Berger Mfg. Co., Canton, O.
Canton Art Metal Co., Canton, O.
Follansbee Bros. Co., Pittsburgh, Pa.
Friedley-Voshardt Co., Chicago, Ill.
Inland Steel Co., Chicago, Ill.
La Belle Iron Works, Steubenville, O.
Merchant & Evans Co., Philadelphia, Pa.
Milwaukee Corrugating Co., Milwaukee, Wis.
National Sheet Metal Roofing Co., Jersey City, N. J.
Stark Rolling Mill Co., Canton, O.
Sykes Company, The, Chicago, Ill.
Wheeling Corrugating Co., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

Rope—Wire.
American Steel & Wire Co., Chicago, Ill.

Rules.
Lufkin Rule Co., Saginaw, Mich.

Sausage Stuffers.
Enterprise Mfg. Co. of Pa., Philadelphia, Pa.

Saw Sets and Saws.
Smith & Hemenway Co., New York, N. Y.

Schools—Sheet Metal Pattern Drafting.
National School of Sheet Metal Pattern Drafting, St. Louis, Mo.

Screens—Perforated Metal.
Harrington & King Perforating Co., Chicago, Ill.

Screw Drivers.
North Bros. Mfg. Co., Philadelphia, Pa.

Shears—Sheet Metal.
Bertsch & Co., Cambridge City, Ind.
Fuller, Otis L., Goshen, Ind.
Kidder Mfg. Co., J. F., Burlington, Vt.
Niagara Machine & Tool Works, Buffalo, N. Y.
Robinson Mfg. Co., J. M., Cincinnati, O.
Smith H. Collier, Detroit, Mich.
Stoll Co., D. H., Buffalo, N. Y.
Weiss, H., & Co., New York, N. Y.

Sheets—Black and Galvanized.
American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Pittsburgh, Pa.
Berger Mfg. Co., Canton, O.
Follansbee Bros. Co., Pittsburgh, Pa.
Inland Steel Co., Chicago, Ill.
La Belle Iron Works, Steubenville, O.
Milwaukee Corrugating Co., Milwaukee, Wis.
Stark Rolling Mill Co., Canton, O.
Sykes Company, The, Chicago, Ill.
Wheeling Corrugating Co., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

Sheets—Ingot Iron.
American Rolling Mill Co., Middletown, O.

Sheets—Planished.
Sykes Company, The, Chicago, Ill.
Ward-Dickey Steel Co., Indiana Harbor, Ind.

Sheets—Steel.
Ward-Dickey Co., Indiana Harbor, Ind.

Sheets—Toncan Metal.
Stark Rolling Mill Co., Canton, O.

Sheets—Vismera.
Inland Steel Co., Chicago, Ill.

Shovels.
Avery Stamping Co., Cleveland, O.

Sifters—Ash.
Diener Mfg. Co., Geo. W., Chicago, Ill.
Hessler Co., H. E., Syracuse, N. Y.

Skylights.
Canton Art Metal Co., Canton, Ohio.

Skylight Gearing.
Weiss & Co., H., New York, N. Y.

Slate Roofing.
Auld & Conger Co., Cleveland, O.
Sheldon Slate Co., Granville, N. Y.

Slating Nails.
Hussey & Co., C. G., Pittsburgh, Pa.

Soldering Irons—Self Heating.
Dobbins Mfg. Co., Minneapolis, Minn.
Lyon Conklin & Co., Baltimore, Md.

Spiders.
Avery Stamping Co., Cleveland, O.

Statuary.
Friedley-Voshardt Co., Chicago, Ill.
Gerock Bro. Mfg. Co., St. Louis, Mo.

Stoves and Ranges.
A. B. Stove Co., Battle Creek, Mich.
Champion Stove Co., Cleveland, O.
Co-Operative Foundry Co., Chicago, Ill.
Estate Stove Co., Hamilton, O.
Foster Stove Co., Ironton, O.
Utility Stove & Range Co., Indianapolis, Ind.
Van Range Co., John, Cincinnati, O.
Wrought Iron Range Co., St. Louis, Mo.

Stove Patterns.
Cleveland Castings Pattern Co., Cleveland, O.
Cope Pattern Works, Geo. W., Detroit, Mich.
Quincy Pattern Works, Quincy, Ill.
Vedder Pattern Works, Troy, N. Y.
Weller Pattern Co., Quincy, Ill.

Stove Pipe and Fittings.
Hemp & Co., St. Louis, Mo.

Stove Polish.
Black Silk Stove Polish Works, Sterling, Ill.
Brauer Supply Co., A. G., St. Louis, Mo.
Dixon Crucible Co., Jos., Jersey City, N. J.
Nickel Plate Stove Polish Co., Chicago, Ill.

Stove Repairs.
Brauer Supply Co., A. G., St. Louis, Mo.

Tapes.
Lufkin Rule Co., Saginaw, Mich.

Technologist.
Hooper, C. N., Dubuque, Ia.

Telephone Wire.
American Steel & Wire Co., Chicago, Ill.

Thermometers—Oven.
Cooper Oven Thermometer Co., Pequabuck, Conn.

Tin—Perforated.
Harrington & King Perforating Co., Chicago, Ill.

Tinners' Tools.
Auld & Conger Co., Cleveland, O.
Berger Bros. Co., Philadelphia, Pa.
Bertsch & Co., Cambridge City, Ind.
Dobbins Mfg. Co., Minneapolis, Minn.
Fuller, Otis L., Goshen, Ind.
Kidder Mfg. Co., J. F., Burlington, Vt.
Lufkin Rule Co., Saginaw, Mich.
Lyon, Conklin Co., Baltimore, Md.
Niagara Machine & Tool Works, Buffalo, N. Y.
Robinson Mfg. Co., J. M., Cincinnati, O.
Smith H. Collier, Detroit, Mich.
Stoll Co., D. H., Buffalo, N. Y.
Weiss & Co., H., New York, N. Y.

Tinplate.
American Sheet & Tin Plate Co., Pittsburgh, Pa.
Berger Mfg. Co., Canton, O.
Follansbee Bros. Co., Pittsburgh, Pa.
Merchant & Evans Co., Philadelphia, Pa.
Milwaukee Corrugating Co., Milwaukee, Wis.
Wheeling Corrugating Co., Wheeling, W. Va.

Tinwars.
Stuber & Kuck, Peoria, Ill.

Torches.
Berns, Otto, Newark, N. J.
Clayton & Lambert Mfg. Co., Detroit, Mich.
Diener Mfg. Co., Geo. W., Chicago, Ill.

Trowels.
Avery Stamping Co., Cleveland, O.

Ventilators.
Berger Bros. Co., Philadelphia, Pa.
Berger Mfg. Co., Canton, O.
Friedley-Voshardt Co., Chicago, Ill.
Globe Ventilator Co., Troy, N. Y.
Lee, Thomas, Cincinnati, O.
Merchant & Evans Co., Philadelphia, Pa.
Milwaukee Corrugating Co., Milwaukee, Wis.
Pullman Automatic Ventilator Co., York, Pa.
Standard Ventilator Co., Lewisburg, Pa.
Wooden Ventilator Co., East Palestine, O.

Water Heaters.
Smith Co., Chas., Chicago, Ill.
Stolz, Frank D. Co., Chicago, Ill.

Wire.
American Steel & Wire Co., Chicago, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.

Wringers.
Lovell Mfg. Co., Erie, Pa.

Wants and Sales

For paid Yearly subscribers AMERICAN ARTISAN AND HARDWARE RECORD will insert under this head advertisements of six lines WITHOUT CHARGE for employers wishing to secure employes, persons seeking situations, parties desiring to purchase a business, business for sale, partners wanted, to exchange, etc. Not exceeding fifty words, the price to non-subscribers is one dollar, payable in advance. Those who respond to these announcements will please mention that they "READ THE ADVERTISEMENT IN AMERICAN ARTISAN."

PATENTS U. S. and Foreign Patents secured. Trade-Marks Registered. Patent Validity and Infringement Opinions.
Consulting Expert HERBERT E. PECK Patent Attorney
Established 1895 WASHINGTON, D. C. Barrister Bldg.

BUSINESS CHANCES.

For Sale—Hardware store in Chicago; will sell on reasonable terms. Must leave city on account of sickness. Address T-35, in care of AMERICAN ARTISAN, 537 South Dearborn St., Chicago, Ill. 24-3t

For Sale—At your own price: 22 pairs outside blinds, assorted sizes; 30 sets No. 3 Clark's Blind Hinges; 4 sets No. 5 Clark's Blind Hinges; 1,000 ⅛-inch No. 21 hoop iron (slightly rusted). Make us an offer. Schlafer Hardware Co., 815 College Ave., Appleton, Wis. 24-3t

For Sale—A good, clean, up-to-date stock of hardware, with tin and plumbing shop in connection. Fine location in one of the best towns in Michigan. This is a well established business and is worth your investigation. Address T-25, in care of AMERICAN ARTISAN, 537 South Dearborn St., Chicago, Illinois. 23-3t

For Sale—Oldest and best established sheet metal and furnace business in Central Nebraska; $5,000 to $6,000 investment. No trades; good reason for selling. It will pay you to investigate. Address T-27, in care of AMERICAN ARTISAN, 537 South Dearborn St., Chicago, Illinois. ufn

For Sale—$6,000.00 stock of hardware and tin shop. County seat in Indiana, fine location, good factories, splendid farming section, a thoroughly good proposition. Other business. No agents. Will deal direct for cash. Address T-28, care of AMERICAN ARTISAN, 537 South Dearborn St., Chicago, Illinois. 23-3t

For Sale—Hardware, plumbing and heating business located in town of 1,000, in center of dairy district Northern Illinois. Good farmers' trade. Stock will invoice about $6,000.00. A1 chance for one or two hustlers. Business established 20 years. Address T-29, care of AMERICAN ARTISAN, 537 South Dearborn St., Chicago, Illinois. 23-3t

For Sale—An improved farm of 136 acres, located near good town in Gratiot County, Michigan. Will accept as payment good, clean stock of hardware of $3,000 to $5,000. No farm implements wanted. For particulars address P. O. Box 136, Saybrook, Illinois. 23-3t

For Sale—Clean, up-to-date stock of hardware, stoves, tools, paints and tin shop. Doing a good business and will be time well spent to look into this. Southern Ohio. Address T-30, in care of AMERICAN ARTISAN, 537 South Dearborn St., Chicago, Illinois. 23-2t

For Sale—Established hardware business with tinshop in a live town, good location. Reasons for selling, sickness. Will sell at a discount if taken at once. Address A. O. Giese, 106 West First St., Duluth, Minnesota. ufn

Stove Salesmen—Why not make extra money handling AMERICAN ARTISAN as a side line? Liberal cash commission paid to subscription solicitors. For information address Circulation Department, AMERICAN ARTISAN, 537 South Dearborn St., Chicago, Illinois.

For Sale—First class hardware and jobbing business, averaging about $8,000 yearly, located on good business street of Chicago. For particulars address T-15, in care of AMERICAN ARTISAN, 537 South Dearborn street, Chicago, Illinois. ufn

BUSINESS CHANCES.

For Sale—An up-to-date stock of hardware and tin shop in a Southern Wisconsin city of about 8,000 population; reason for selling, other business demands my attention. Good farming and manufacturing trade. An exceptional opportunity for the right party. Address "T. 1," care of AMERICAN ARTISAN, 537 South Dearborn street, Chicago, Illinois. ufn

TINNER'S TOOLS.

For Sale—1 Niagara Square Shear, 36-inch; 1 Peck-Stow Wilcox Large Turner; 1 30-inch stove-pipe folder. These are second hand, but used only a short time and will sell at a bargain. Address J. J. Spohn, 305 North Third St., Watertown, Wis. 24-3t

For Sale or Exchange—1 Hayden Automatic Concrete Block Machine; 1 No. 2 Gates Gasatory Stone Crusher. Would exchange either for 8-foot cornice brake. Address Hinton Construction Co., 316 Summers St., Hinton, W. Va. 24-3t

Wanted to Buy—A complete set of second-hand tinners' tools, same to be in first-class condition and price right for cash. Address C. A. Williams, 641 Adams St., Gary, Ind. 24-3t

Wanted — One Second-Hand Cornice Maker's Crimper. I want one in good condition. State what other tools you have. Address Fitch Manufacturing Co., Wayland, Michigan. 22-3t

HELP WANTED.

Wanted—Superintendent of stamping and enameling plant; one who has had practical experience in making stamped and pieced tinware and can undertake installation of machines. State experience and give references. Address T-33, in care of AMERICAN ARTISAN, 537 South Dearborn St., Chicago, Ill. 24-2t

Wanted—A live, hustling young man to take working interest in hardware store, having some experience as tinner. Steady employment the year 'round. None but honest, hustling men need apply. State in first letter salary wanted; whether married or single. Address Norton & Rosencrans, Rowley, Iowa. ufn

Wanted—A first-class, reliable man who can do plumbing, also has a fair knowledge of tin work, warm-air heating, steam and hot-water heating. To such a man can offer a steady job at good wages; will give in addition a percentage of profits to right man. Boozers need not answer. Address T-34, in care of AMERICAN ARTISAN, 537 South Dearborn St., Chicago, Ill. 24-3t

Wanted—A first-class hot air furnace salesman in the State of New York for a well known trade-mark line of furnaces. Address T-26, care of AMERICAN ARTISAN, 537 South Dearborn St., Chicago, Illinois. 23-2t

Wanted—At once, a good, sober, reliable man. One that can do tinning, plumbing and such work that comes in a country shop. Have a good chance for the right man. Work the year around, good wages. No booze fighter need write, as we have no time to answer. Address T-21, care of AMERICAN ARTISAN, 537 South Dearborn Street, Chicago, Illinois. 22-3t

Wanted—Several Sheet Metal Workers, good on general job work about a large factory. Good wages and steady work for first-class men. Address T-19, care of AMERICAN ARTISAN, 537 South Dearborn Street, Chicago, Ill. 22-3t

Wanted—An experienced stove salesman in the Southern territory. None but first-class, energetic man need apply. To receive consideration, applicant must state age, experience, territory he has been making, also furnish ample reference. Will pay good salary or commission. Address "STOVE MANUFACTURER," care of AMERICAN ARTISAN, 537 South Dearborn St., Chicago, Illinois. UFN

Branch Manager Wanted—An energetic and competent man experienced in warm air furnaces and steam and hot water boilers, to represent an aggressive Eastern manufacturer as manager of their Chicago branch. Good opportunity for man of the right kind. Address, giving age, experience and references, T-31, in care of AMERICAN ARTISAN, 537 South Dearborn St., Chicago, Illinois. 23-2t

Wanted—Tinner and all around man, steady to locate in Hamilton, Ohio. Address Philip Held & Son, 308 N. 7th St., Hamilton, Ohio. 23-3t

HELP WANTED.

Stove Salesmen wanted for Minnesota, South Dakota and Iowa territory. Must have road experience. Address T-22, care of AMERICAN ARTISAN, 537 South Dearborn St., Chicago, Illinois. 22-3t

SITUATIONS WANTED.

Situation Wanted—First-class hardware man with knowledge of tin and plumbing work, wishing to spend the winter in warmer climate, will accept position with some firm at reasonable wages to help defray expenses; Florida or Georgia preferred. 35 years old; no bad habits. Address T-32, care of AMERICAN ARTISAN, 537 South Dearborn St., Chicago, Ill. 24-3t

Situation Wanted—Salesman, six years' road experience, fourteen years' practical knowledge of all classes and styles of heating apparatus. Open for position January 1st. Address A. A. Driggs, 172 Elton St., Brooklyn, New York. 23-3t

Situation Wanted—Furnace Salesman who thoroughly understands warm air heating desires to make a change January 1, 1913. Address T-20, care of AMERICAN ARTISAN, 537 South Dearborn St., Chicago, Illinois. 22-3t

SPECIAL NOTICES.

WANTED

Foreman for Stove Mounting Department of a Factory, making a high grade line of Stoves and Ranges in the Central West. Must be competent to handle men and turn out good work. Excellent opportunity—reference required. State experience and age. Address T-13, care of AMERICAN ARTISAN, 537 South Dearborn St., Chicago, Illinois. 23-3t

For Sale—Registers

Cheap. Stock of Registers on hand—also patterns, flask follow boards. We are going out of business. Address "DISCOUNT," care of AMERICAN ARTISAN, 537 South Dearborn Street, Chicago, Illinois, u. f. n.

FOR SALE
Warm Air Register Business

Our other interests demand our foundry space. We will close out patterns, flasks, follow boards, everything complete, including Stock of Registers on hand. Address "BUSINESS," care of AMERICAN ARTISAN, 537 South Dearborn Street, Chicago, Illinois. u. f. n.

SPECIAL NOTICES.

Salesman Wanted

Energetic Salesmen, having established trade can secure an excellent medium priced line of Steel and Cast Ranges, Cast Cooks and Oak Heaters on a commission basis. Will give exclusive territory if you write at once, stating full particulars. Our goods are well and favorably known to the trade. Address B-8, in care of AMERICAN ARTISAN, 537 South Dearborn St., Chicago, Illinois. 24-3t

WANTED

An A-1 Salesman thoroughly experienced in metal ceiling and sheet metal line. Give reference and salary wanted. California Steel Ceiling Co., 8th and Santa Fe, Sts., Los Angeles, California. 24-3t

WANTED

Practical Furnace and Boiler Salesman for Indiana and Michigan. Reply, giving full particulars, salary, experience, territory covered, etc. Address B-7, in care of AMERICAN ARTISAN, 537 South Dearborn St., Chicago, Illinois. 24-2t

WANTED

Three competent stove salesmen for 1913. None but sober and industrious men need apply. State territory preferred. Address Belleville Stove & Range Co., Belleville, Illinois. 24-3t

Wanted

Two experienced furnace, hot water and steam heater salesmen, for the states of Wisconsin and Minnesota. Old established line, well known in territory. Address "HEATER" care of AMERICAN ARTISAN, 537 South Dearborn Street, Chicago, Ill.

SITUATION WANTED

First-Class Stove Salesman with good established trade in Minnesota and Montana, best references. Address B-5, care of AMERICAN ARTISAN, 537 South Dearborn St., Chicago, Illinois. 22-3t

SITUATION WANTED

Stove Salesman, covered Ohio, West Virginia and Pennsylvania for ten years and good established trade, considered good business man, best habits. A1 references. Address B-6, care of AMERICAN ARTISAN, 537 South Dearborn St., Chicago, Illinois. 22-3t

WANTED

A first class, experienced Furnace Salesman for Wisconsin, Northern Iowa, Minnesota, and Dakota territory. The Wise Furnace Co., Akron, Ohio. 21-3t

SPECIAL NOTICES.

A High Grade Sales Manager

now associated with one of the largest stove manufacturers desires to make new connections Jan. 1st, 1913. Able to handle a large force of salesmen and can promote an extensive and successful business. An expert in handling credits and office detail. Over fifteen years' experience in stove and range business. Address B-2 AMERICAN ARTISAN, 537 South Dearborn Street, Chicago, Illinois. 20-3t

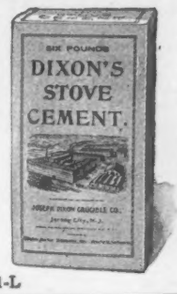
WANTED

EXPERIENCED AND COMPETENT STOVE SALESMEN WANTED:—By Ohio Manufacturer of well known complete Trade Mark Line for territory in middle States. A Commission proposition with reasonable guaranteed earning and with traveling Expenses paid. Good permanent positions for salesmen of right qualifications and who have made good in actual stove selling. Do not bother to reply unless you have. Address with full particulars T-24, care of AMERICAN ARTISAN, 537 South Dearborn Street, Chicago, Illinois. 22-2t

SPECIAL NOTICES.

WANTED

An experienced Stove Salesman for Iowa territory to represent one of the oldest trade-mark lines. We require a man acquainted with this territory. Must furnish satisfactory references which will be held confidential. Splendid opportunity. Answer W. T. 1913 care of AMERICAN ARTISAN, 537 South Dearborn Street, Chicago, Ill. 20-1t



For cracked or worn stove, range and furnace linings DIXON'S STOVE CEMENT is absolutely unequaled.

It is a coarse, dry powder, runs absolutely uniform, drys quickly and may be fired soon after application. Write for folder No. 18-L. It tells all.

Joseph Dixon Crucible Company
Jersey City, N. J.

1-L

C. N. HOOPER
DUBUQUE, IOWA
Vitreous Enameling
TECHNOLOGIST
Designs, builds and starts new plants, improves quality and reduces cost, in those already established.

SHEET METAL WORKERS

Learn PATTERN DRAFTING
This Winter. "It Will Pay You"

We are headquarters for teaching Practical Pattern Drafting; our methods are shortened and prepared to meet competition with expert mechanics. We also lay out full sized patterns according to plans and specifications. A trial will convince you.

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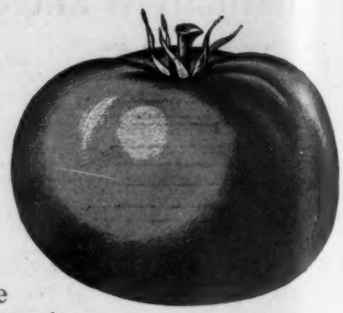
ADVERTISING is today the mightiest factor in the business world. It is an evolution of modern industrial competition. It is a business builder, with a potency that goes beyond human desire. It is something more than a "drummer" knocking at the door of the consumer—something more than mere salesmanship-on-paper. It is a positive, creative force in business. It builds factories, sky scrapers and railroads. It makes two blades of grass grow in the business world where only one grew before. It multiplies human wants and intensifies human desires. It furnishes excuse to timorous and hesitating ones for possessing the things which under former conditions they could easily get along without.

The "Tomato" Period of Manganese



THERE'S a small percentage of Manganese in VISMERA Sheets put there for a purpose; and we learn that there are still a few uninformed people who are prejudiced against Manganese in a ferrous product.

★ ★ ★ ★ ★

Somebody, doubtless a professor of botany, announced, in our grandfather's time, that the ***tomato was a deadly poison!***

He ***inferred*** that fact, because the tomato belonged to the "deadly" nightshade family. He didn't try it on the dog — not even on the vicarious guinea pig — he just inferred.

Then a lot of students who graduated from such old-school pedagogues became teachers and writers of books, and they, too, repeated the tomato story.

Meanwhile some highly idiotic persons began EATING tomatoes, because they didn't know any better, and they ***thrived*** on them!

★ ★ ★ ★ ★

Nowadays one reads in text books, written by men who got their information from still older text books, that "manganese is a menace in steel" — a "poison," if you please.

They don't try manganese in the furnace, not even on the iron pig; they just remember an older diction, and ***infer.***

Meanwhile "The Inland," because it ***does*** know better, puts .2% manganese in its

VISMERA SHEETS

and finds it good — exceedingly good — remarkably useful.

Old-time methods have passed away. In those days they did not know how to eliminate impurities that actually did induce corrosion; but rolled them mechanically into the sheet, with great layers of slag such as no mill would permit nowadays. What manganese was found in their products was not ***combined*** with the iron, but segregated, and because of their primitive processes was of course a defect.

So, by inference, manganese, because it belonged to the slag family, from their primitive experience with slag, became classed as a poison to iron or steel.

Now what are the facts?

First, and recognized by up-to-date metallurgists everywhere, manganese in the bath is the greatest known "scavenger" in the manufacture of iron or steel, freeing it by chemical combination from sulphides, oxides and other impurities, and it seems quite certain that the residue of manganese, which does not pass off in combined gases and which properly handled combines so perfectly with it, permeates the whole mass and gives a greater density and tensile strength to the finished metal.

Certain it is that the "Inland" combination of a little less than 2-10 of one per cent of manganese and about 2-10 of one per cent of copper in conjunction with our use of **new** Pig Iron from our own blast furnaces and ***new*** Open Hearth crop ends from our billet mills, produces a metal of great strength and toughness, and of unapproached resistance to rust and corrosion.

★ ★ ★ ★ ★

The way men discovered the virtues of the succulent tomato was by ***eating*** them. The way ***you*** can discover the virtues of the wonderful VISMERA is by ***working*** it and testing Vismera side by side with the best rust resisting metal you ever heard of.

Send for samples and prices.

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First National Bank Building, Chicago

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Branch Offices: ST. PAUL, Pioneer Building; ST. LOUIS, Nat'l Bank of Commerce Bldg.; DENVER, 1618 Stout Street; DALLAS, Praetorian Building; MADISON, WIS., 929 Spaight Street

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We control the quality of La Belle sheets "from mine to market."

La Belle Iron Works

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Works
Wheeling, W. Va.

Works
Steubenville, Ohio

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EVERY product that we make **must be the best of its kind** at the **time it is produced and sold.**

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Black and Galvanized

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BILLETS AND PLATES

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AMERICAN INGOT IRON

—THE—

American Rolling Mill Co.
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Licensed Manufacturers under patents granted to the International Metal Products Company.

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The Canton Steel Ceiling Co.
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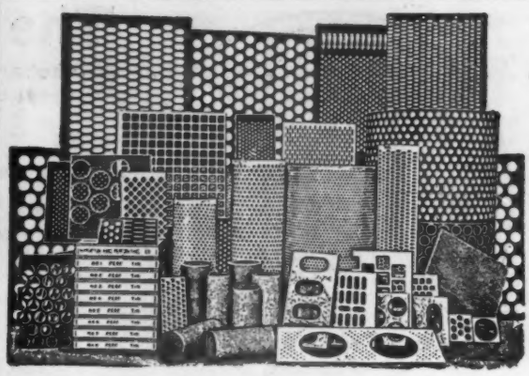

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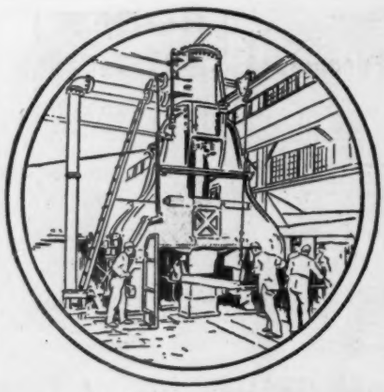

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Just Remember

SCOTT'S EXTRA COATED ROOFING TIN

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The purest practical quality open hearth metal made better by this "Strictly Follansbee" Hammering Process.

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HAVE NO CROSS SEAMS. MADE OF GALVANIZED IRON IN 10 FT. LENGTHS.

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Made from Galvanized Tin and Painted Tin
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THEY are furnished in a variety of colors and grades to meet every requirement.

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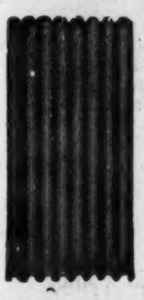

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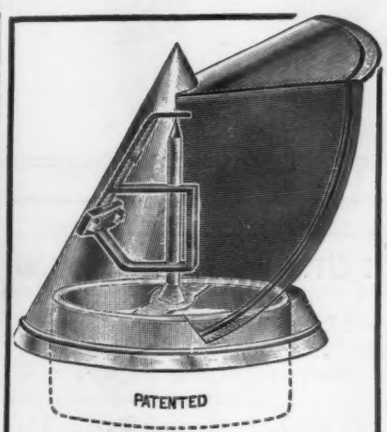

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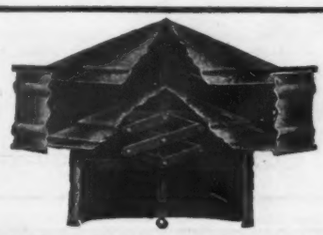

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This booklet will also show you the great variety of styles the "Lee" is made in, and some of the more prominent buildings upon which they are used.

Write for it today.

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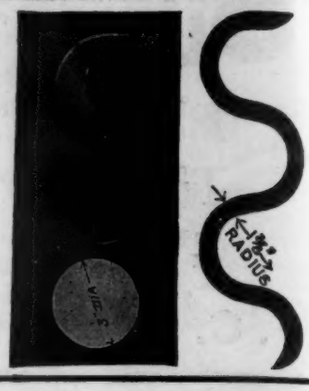
¶ It will cut holes 3 inches in diameter and larger without cutting in from side of sheet. This feature is of the greatest importance to **Furnace Installers** for cutting openings in casings, domes, elbows, in fact any irregular fitting.

¶ The **"Quickwork"** cuts fast—five times as fast as when done with hand snips. It leaves the edges so flat that it gives a finish equal to die work.

¶ You'll be surprised to see how perfect the cuttings are. We will send you some sample cuttings and our literature. Write for them today.



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Maker of Sheet Metal Workers' Machinery
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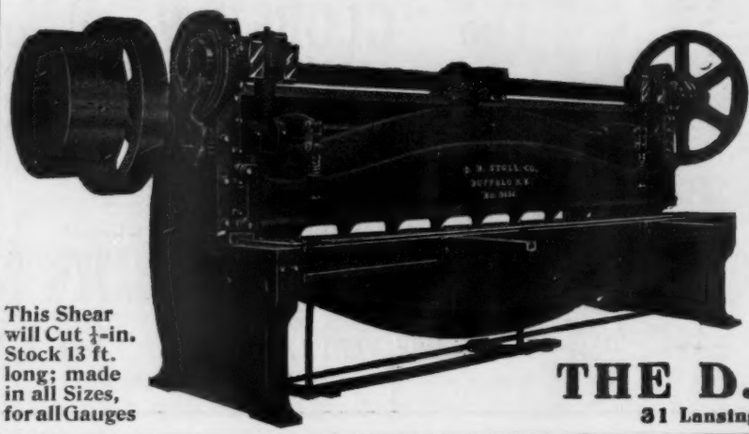

This Shear will Cut ¼-in. Stock 13 ft. long; made in all Sizes, for all Gauges

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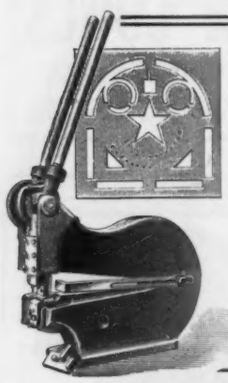

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will cut the inside and outside of practically any size circle. Throat is 16 inches deep. Especially adapted for cutting forms of intricate design.

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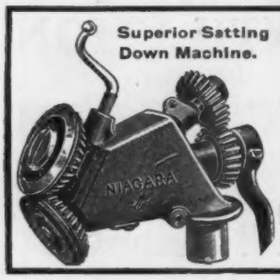

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You can do a job quicker, better and easier if you use a

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The most economical and hottest on the market

Noiseless, odorless and smokeless in operation. **Our No. 10 has the greatest range in heating of any furnace made,** namely 3 to 12 lb. coppers, indoors or on a roof in cold and windy weather. **Order of your jobber or we will ship direct for $6.50 on 30 days' approval.**

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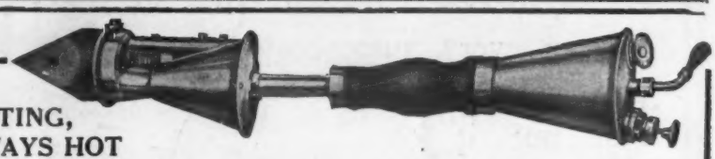

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Your jobber can supply you or write us direct.

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is entirely **different** from the general run of torches. Easy to handle on account of the perfect 'balance" and slant of its handle. **Seamless.** A perfect regulator and pump of drawn brass. Made on entirely new lines. Modern, economical and unusually strong. Ask for prices and descriptions of our entire line of firepots and torches.

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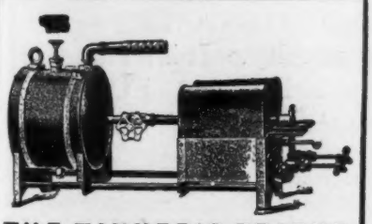

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SOLDERING FURNACE
QUICK, POWERFUL and DURABLE

Heavy Brass Tank with Brass Pressure Pump. Will Heat any size Soldering Iron. Suitable for bench or outside work. Special price made to tinners.

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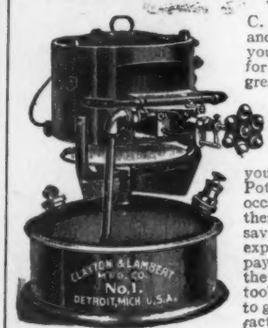
DOLLARS—DOLLARS—DOLLARS



No. 1 Fire Pot
Price Each $6.00 Net

C. & L. Fire Pots and Torches enable you to save dollars for they produce greater heat while using less fuel than other makes. Your fuel expense is constant, but you purchase a Fire Pot or Torch only occasionally. If, therefore, you can save half your fuel expense, it will soon pay for the cost of the fire. C. & L. tools are guaranteed to give perfect satisfaction in the hands of the user.

Your nearest jobber will supply at factory price or we will ship direct if cash accompanies the order. Send for booklet—it's free.

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IT WILL PAY YOU

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These cuts are furnished with catch-lines showing their application to the hardware, stove and tinners' trade. Address

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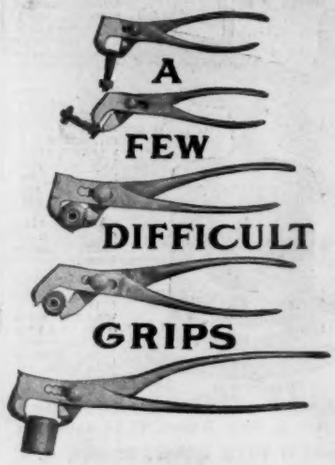
The EAGLE Claw Wrench

Does the work of **ALL** wrenches and work no other tool **CAN DO.** It is a combination of a nut-wrench, a pipe-wrench and pliers. Made of drop-forged steel with long handles that give a tremendous leverage.

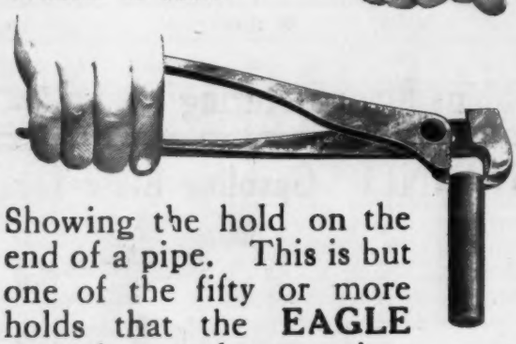
With the **EAGLE CLAW WRENCH** the most difficult holds may be had on any pipe, nut or bolt.



This is a tool that every mechanic needs. It will find its way to every automobile owner in a short time. Just put it on your counter. Watch it sell.

This illustrates a grip that is impossible with any other wrench than the **EAGLE.** When a round-headed bolt is flush against wood, you can take a firm grip on it and actually turn the bolt. No other wrench on earth could do this.

Illustration shows the wrench with a tapering hold on a bolt. Only the head of one side tapers and the other side is flat, having a grip that cannot be twisted out of the jaws of the wrench. The harder you pull, the tighter the grip becomes.



Showing the hold on the end of a pipe. This is but one of the fifty or more holds that the **EAGLE** wrench can take on a pipe. You cannot break this grip — the pipe will have to break first.

Dealers: **THE EAGLE CLAW WRENCH** is no novelty. It is a standard tool made of the very best materials and **FULLY GUARANTEED.** Two styles and five sizes, to suit every class of work. Better order a sample of each style today.

WRITE US FOR LITERATURE AND PRICES.

AMBLER, HOLMAN & CO.

565-571 W. Washington Blvd. **CHICAGO, ILL.**

These handsome and effective illustrations are typical of those appearing in our 1912-13 advertising.

You ought to handle all these ENTERPRISE Goods —They are Staple

Meat and Food Choppers	Sausage Stuffer and Lard Presses
Bone Shell and Corn Mills	Sad Irons
Polishing Irons	Coffee Mills
Cherry Stoners	Ice Shredders
Beef Shavers	Cheese Cutters
Tobacco Cutters	Motor Choppers
Raisin Seeders	Lawn Sprinklers
Measuring Faucets	Bait Choppers
Cobbler's Kits	Meat Hooks
Electric Mills	Paste Makers
Drug Presses	Tincture Presses
Flagpole Holders	Measuring Pumps
Bunghole Borers	Cork Presses
Paint Faucets	Vegetable Slicers

Every Day Counts Now

Housekeepers are ready. Times are good; crops enormous; factories working full time. Purses bulging. The buying season is on and high quality is in greater demand than ever before.

Our big advertising campaign now running stands at the head in attracting buyers. Look in the good magazines and leading publications and see how large space advertisements are telling the news about Enterprise specialties and reaching more people than ever before.

We have a plan to bring these reading buyers to your store after our goods and keep this point in mind:

If it is an

ENTERPRISE

Then it is Profitable for You

The illustrations show the class of illustrations we are using in the ENTERPRISE Meat AND Food Chopper publicity. Attractive? Sure! Trade winning? You have guessed it. Always easy to sell. Enterprise goods are more popular than ever. Our reputation grows, because it backs up our advertising and the home-makers know that any article with our ENTERPRISE stamp is made up to the highest standard of manufacture.

Write to-day for Enterprise Catalogue

A book that will be in frequent demand for reference. A partial list is given in this advertisement. We will send you free our selling helps, including window trims, and store hangers, beautiful and effective advertising matter, and a service that is free.

THE ENTERPRISE MFG. CO., OF PA.
Philadelphia, Pa.

2 Murray Street, New York, N. Y.
530 Golden Gate Avenue, San Francisco
176 North Dearborn Street, Chicago

THE YOUNGSTOWN SHEET AND TUBE COMPANY

YOUNGSTOWN, OHIO

BUCKEYE FENCE

THE YOUNGSTOWN SHEET & TUBE COMPANY NEW PROCESS PATENTED YOUNGSTOWN, OHIO. GALVANIZED SHEETS

WE have prepared an attractively illustrated booklet dealing with the prevention of accidents to our employees. If you have not received one of these booklets we will be glad to mail you one upon request.

DOUBLE REFINED PUDDLED IRON ROOFING

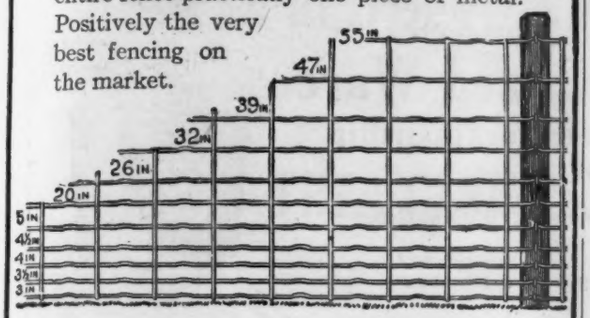
DISTRICT SALES OFFICES

NEW YORK CITY — PHILADELPHIA, PA.
BOSTON, MASS. — CHICAGO, ILL.
PITTSBURG, PA. — DENVER, COLO.
DALLAS, TEX. — SAN FRANCISCO, CAL.

STAR IRON BRAND PIPE Y STEEL BRAND

"PITTSBURGH PERFECT"
Electrically Welded Fence

is made in all styles and sizes. All line and stay wires are the same gauge wire. Electric welding each joint makes the entire fence practically one piece of metal. Positively the very best fencing on the market.



Our new sales producing arrangement with dealers has proven to be a great success. Why not link **your** store to this campaign for **better fencing?** The proposition we offer to agents is most attractive. Send for it.

PITTSBURGH STEEL CO.
PITTSBURGH, PA.

"CINCH" STAYS

What They Are and What They Do

¶ A "Cinch" Stay is a twisted piece of extra strong No. 10 galvanized wire that is augered down over the line wires of a barb-wire fence, preventing the wires from spreading and at the same time making the fence absolutely rigid.

¶ Both the railroads and the Government have found by actual test that a fence equipped with **"Cinch"** Stays requires a fewer number of posts. **That's why** they are using millions of **"Cinch"** Stays on their fences at present.

¶ It won't be long before every farmer in your community will have "Cinch" Stays on his fence too. Why not handle this business? It's yours for the asking. Write us today for samples and prices to the trade. Just at present the field is practically unlimited. Act quickly.

WORTH WIRE WORKS
KOKOMO, INDIANA

AMERICAN STEEL & WIRE CO'S

AMERICAN WIRE NAILS

Common and Miscellaneous, Box, Casing, Flooring, Fence, Tobacco, Boat, Roofing, Slating, Shingle, Finishing, Clinch, Hinge, Car, Barrel, Fine, Lining, Clout, Broom, Basket, Berry-box, Wagon, Dowel, Tie-marking Nails, Staples, Escutcheon Pins, Large head barbed roofing nails, American felt roofing nails, R. R. and Boat Spikes.

Catalogue illustrating all kinds of Wire Nails furnished upon application.

We Make

American Wire Rope	Barbed Wire
Aeroplane Wire and Strand	Woven Wire Fencing
Piano Wire	Fence Gates
Mattress Wire	Steel Fence Posts
Weaving Wire	Concrete Reinforcement
Broom Wire	Springs
Fence Wire	Sulphate of Iron
Flat Wire	Poultry Netting
Flat Cold Rolled Steel	Wire Rods
Wire Hoops	Juniata Horse Shoes and Calks
Electrical Wires and Cables	Shafting Cold Drawn Steel
Rail Bonds	Wire of Every Description
Bale Ties, Tacks, Nails, Staples, Spikes	

We issue separate catalog for each of these. Gladly furnished upon application.

American Steel & Wire Co.'s Sales Offices

CHICAGO 72 West Adams Street
NEW YORK 30 Church Street
WORCESTER 94 Grove Street
BOSTON 120 Franklin Street
PITTSBURG Frick Building
CINCINNATI Union Trust Building
CLEVELAND Western Reserve Bldg.
DETROIT Ford Building
ST. LOUIS Third Nat'l Bank Bldg.
MONTREAL Bank of Ottawa Bldg.
ST. PAUL-MINNEAPOLIS Pioneer Building, St. Paul
DENVER First Nat'l Bank Bldg.
SALT LAKE CITY 736 South 3rd West Street
SAN FRANCISCO 19th & Folsom Sts.
PORTLAND Ninth & Irving Sts.
SEATTLE 4th Ave., S. & Conn. St.
LOS ANGELES Jackson & Central Avenues
NEW YORK United States Steel Products Co., 30 Church St. Export Representatives

Water Pails

Shipping Pails

Contractors' Pails

Fire Pails

Conical Fire Pails

Wheeling Galvanized Ware

Superior in quality and workmanship

MADE BY

WHEELING CORRUGATING COMPANY. WHEELING, W. VA.

BRANCH OFFICES AND STORES

NEW YORK CHICAGO PHILADELPHIA
ST. LOUIS KANSAS CITY CHATTANOOGA

Sap Pails

Wash Tubs

Ash Cans

Oil Cans

Garbage Cans

GENUINE

"PHILADELPHIA"

LAWN MOWERS

Are the *PROGRESSIVE* Mowers of the Present Day

They were the first side-wheel mowers made in this country and were the foundation from which the present style Lawn Mowers were built.

"Philadelphia" Mowers do not chop, pull or mangle the grass but are a **perfect shear cut**—the only true way of cutting lawns.

All knives **Vanadium Crucible Steel**—finest and toughest steel known and will outwear any two knives of the ordinary crucible steel. Workmanship the best obtainable.

The testimonials from parties using **"Philadelphia"** Mowers for 25 to 30 years are the best evidence of the durability and high-grade quality of these machines. The very name **"Philadelphia"** means all that is BEST in Lawn Mowers. Buy Mowers with a reputation and your customers will be satisfied.

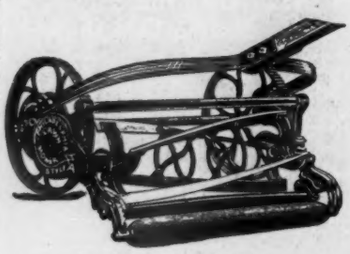
"Philadelphia" Horse Mowers are known everywhere as the finest and **most satisfactory** Horse Mowers made.

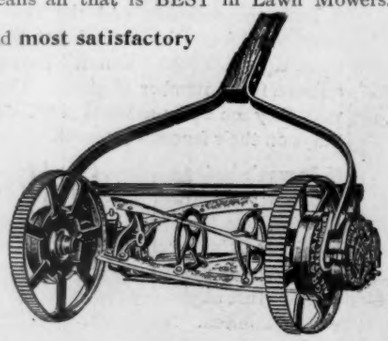
HAND MOWERS:
Graham, "A" All Steel, E, C, K, S, T, M, XX, and Golf

HORSE MOWERS:
Open and Closed Cylinders, Philadelphia Eagle, I. X. L. and Pony

We Manufacture Mowers Exclusively

Illustrated Catalog and Prices are Ready


Style A—All Steel
Trade Mark Registered


Graham—All Steel
Pat. Aug. 27, 1912

THE PHILADELPHIA LAWN MOWER COMPANY

LARGEST MAKERS OF HIGH-GRADE MOWERS IN THE WORLD

31st and Chestnut Streets PHILADELPHIA, PA., U. S. A.

Anyone can talk about Quality

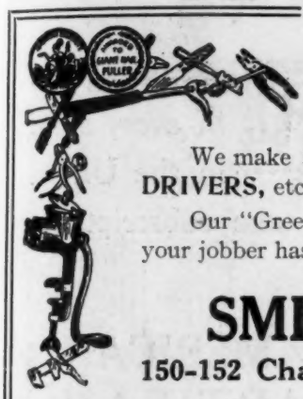
But "RED DEVIL" Tools and Hardware Specialties

Have Proven Their Qualities

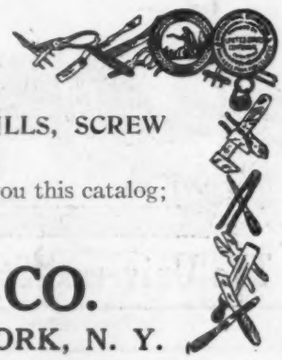
"RED DEVIL" GLASS CUTTERS

are made in more than 40 different styles for any kind of glass. We pay particular attention to the wheels.

THE "GIANT" NAIL PULLER



has stood the test for 40 years. It has been awarded three first prizes as the best. It is imitated by many, equalled by none.

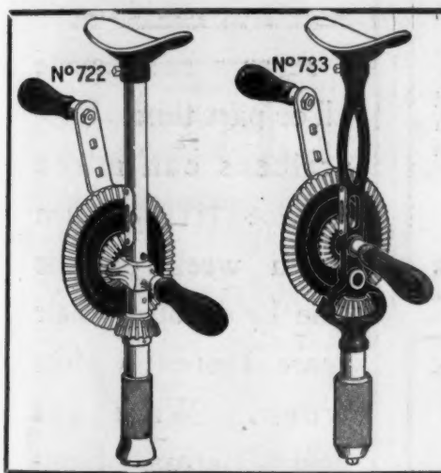


We make **STEEL PLIERS, MITRE BOXES, CHAIN DRILLS, SCREW DRIVERS,** etc. They all excell.

Our "Green Book" will tell you all about them. Let us mail you this catalog; your jobber has the goods.

SMITH & HEMENWAY CO.

150-152 Chambers St., **NEW YORK, N. Y.**



Stanley Tools

Stanley BREAST DRILLS are of the highest workmanship, material and general finish.

Only two numbers are shown here but we offer twelve different styles from which you can make your assortment.

A special circular describing same in detail will be sent upon request.

STANDARD THE WORLD OVER

Stanley Rule & Level Co.

New Britain, Conn. U.S.A.

EVERY TOOL GUARANTEED

You Should Order the LIGHTNING

now—for shipment later if you like. They are always in demand and well advertised. They are easily sold and stay sold, which means a good NET profit to the dealer. They bring trade and help to keep it. Do it now.

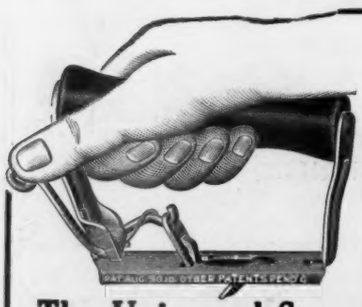
Your Jobber Will Supply You

NORTH BROS. MFG. CO., PHILADELPHIA, PA.

When a woman wants to buy a
Clothes Wringer
and you tell her you handle
Anchor Brand
it's as good as sold.

Please send for our new Catalog No. 7

Lovell Manufacturing Co., Erie, Pa., U. S. A.



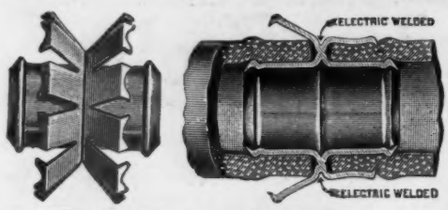
HERE is the handle that fits any and ALL makes of
Mrs. Potts' Sad Irons—

The UNIVERSAL

Note the correct slant of the handle, and the leverlock that can be operated with the thumb. Retailing at 10 cents, dealers will find this a fast selling article. All leading jobbers sell them.

The Universal Stamping & Mfg. Co. Cleveland Ohio U.S.A.

IMPROVED PERFECT CLINCHING **HOSE MENDER**



The tubes and clamps are stamped from one piece of Open Hearth Steel. Retinned to prevent rust. Made in four sizes. Packed two dozen in a display box.

Have you our complete catalog?

STUBER & KUCK, Peoria, Illinois

"NEVER-BREAK"
TRADE MARK

"NEVER-BREAK"
Steel Spiders, Griddles and Kettles
WILL NOT *Scale Off* like cheap enamel.
WILL NOT *Scorch or Burn* like light fry pans and skillets.
WILL NOT *Absorb Grease or Flavors* like cast iron.
CATALOG FOR THE ASKING.

No Tin Handles to come off.
THE AVERY STAMPING CO.,
Sole Manufacturers "NEVER-BREAK" Goods.
Cleveland Ohio U.S.A.

ELEVATORS
Improved, Quick and Easy Rising, Steam, Electric and Hand Power.
SEND FOR CIRCULAR
KIMBALL BROS. CO.
1031 Ninth St., COUNCIL BLUFFS, IOWA
Kansas City Office, 717 Commerce Bldg., Kansas City, Mo.

CINCINNATI IRON FENCE CO.
FREE CATALOGUE
AGENTS WANTED

Largest Iron Fence Factory in Ohio.
Address DEPT "T" for prices. CINCINNATI, OHIO

WE want agents in every state in the Union to take subscriptions for

AMERICAN ARTISAN

Agents can devote all or part time. Subscribers can make a nice little sum each week on the side by devoting their spare time to this work. Write for agents' terms. Sample copies sent upon request.

Address,

AMERICAN ARTISAN
537 South Dearborn St.
CHICAGO, ILL.

LUFKIN MEASURING TAPES

are made in every conceivable variety, to suit every purse and purpose, but all of the same superior quality.

Our extensive advertising creates a demand that every progressive dealer should be able to satisfy.

It takes but a minute and a postal to ask for our catalog—*it's more than worth while.*

PLEASE MENTION AMERICAN ARTISAN

THE LUFKIN RULE CO. *SAGINAW, MICHIGAN, U. S. A.*
New York, London, Eng., Windsor, Ont.

The HESSLER R. F. D. Mail Box

is the only strictly first-class rural mail box on the market selling at a **popular price.** Handsome and durable. Made in two styles.

Send for our complete catalog and let us quote you a real low price. We'll send both. Just write us today.

H. E. HESSLER CO.
Syracuse, N. Y.

THE HIGHEST GRADE FILE MADE

DELTA

TRADE MARK DELTA

DELTA FILE WORKS
PHILADELPHIA, PA.
Chicago Office, 108 W. Lake St.
New York Office, 38 Wooster St.

FILES OF QUALITY

FILES

THE FILE YOU WILL EVENTUALLY USE

HELLER

CELEBRATED AMERICAN
HORSE RASPS AND FILES
CUT WELL & WEAR WELL

HELLER BROS. CO., Newark, N. J.
ESTABLISHED 1836 INCORPORATED 1899

Lightning Rods

Have you ever given serious thought to selling

LIGHTNING RODS

as a side line? Hardware men and tinsmiths can make big money on the side. All you need to do is to send us a list of your neighbors who have no rods on their property. We send out convincing literature that lands an order nearly every time. Let us send such orders to you.

Write for Agency particulars and get our new catalog "B." Do it today.

Read This

The E. A. Foy Co.
815 Broadway
Cincinnati, Ohio

"Sure-Catch" Gate Latch

is a positive-lock latch for farm yard gates, barn doors, box stalls, etc. Made of heavy **wrought iron.** It can not break or wear out. Works automatically. Impossible to open door by jarring when once locked. The only one of its kind made. Be sure you get the **"SURE-CATCH."**

Send for trade prices.

Broadbelt Manufacturing Co.
607 Water Street **Baltimore, Md.**

"Never make the same mistake twice"—if you were not advertising yesterday, start today.

STOP LOOK READ

A WHOLE PAGE OF OUR BEST CLUBBING OFFERS

AMERICAN ARTISAN PLACES WITHIN YOUR REACH ONE OF THE GREATEST AND BEST MAGAZINE OFFERS EVER MADE. GET YOUR TRADE JOURNAL AND TWO OR MORE OF YOUR FAVORITE MAGAZINES FOR VERY LITTLE MORE THAN THE COST OF ONE PUBLICATION.

HOW TO GET THE COST OF YOUR COMBINATION

Choose the three or more magazines you wish and simply add the class numbers before the name of the magazines and multiply by 5.

Example — AMERICAN ARTISAN AND HARDWARE RECORD, Class 25; Review of Reviews, Class 35; Cosmopolitan, Class 23. Total makes 83—Multiply by 5 and the price to you for this combination is $4.15. Notice the regular prices are also given, showing you the money saved.

THINGS OF IMPORTANCE TO THE SUBSCRIBER

If you prefer, magazines may be sent to different addresses. When subscriptions are renewals, same will be extended from the time subscription expires.

You can take advantage of this offer only by including three magazines in the club and ordering AMERICAN ARTISAN AND HARDWARE RECORD as one of the three.

MAKE YOUR SELECTIONS FROM THE LIST GIVEN BELOW—LEADING MAGAZINES OF TO-DAY

Class Number.		Regular Price.
25	AMERICAN ARTISAN	$2.00
23	Cosmopolitan	1.50
23	Delineator	1.50
23	Everybody's Magazine	1.50
9	McCall's (including one pattern)	.50
17	Pictorial Review	1.00
23	Popular Electricity	1.50
35	Review of Reviews	3.00
23	Technical World	1.50
12	Designer	.75
23	Etude	1.50
23	Good Housekeeping	1.50
8	American Poultry Journal	.50

Class Number.		Regular Price.
23	McClure's Magazine	$1.50
25	Woman's Home Companion	1.50
24	Electrician & Mechanic	1.50
70	Harper's Weekly	4.00
55	Scientific American	3.00
23	Red Book	1.50
8	Ladies' World	.50
12	Woman's Magazine	.75
8	People's Home Journal	.50
17	American Boy	1.00
8	Farm & Fireside	.50
12	Home Needlework	.75

Magazines having the same class number indicated before the name may be substituted for one another in the following combinations:

	Reg. Price.	Our Price.
AMERICAN ARTISAN	$2.00	
Cosmopolitan	1.50	
Technical World	1.50	$3.55
	$5.00	

	Reg. Price.	Our Price.
AMERICAN ARTISAN	$2.00	
Pictorial Review	1.00	
People's Home Journal	.50	$2.50
	$3.50	

	Reg. Price.	Our Price.
AMERICAN ARTISAN	$2.00	
Good Housekeeping	1.50	
Delineator	1.50	$3.55
	5.00	

	Reg. Price.	Our Price.
AMERICAN ARTISAN	$2.00	
McClure's	1.50	
McCall's	.50	$2.85
	$4.00	

AMERICAN ARTISAN AND HARDWARE RECORD

DANIEL STERN, Publisher — 537 South Dearborn Street Chicago, Ill.

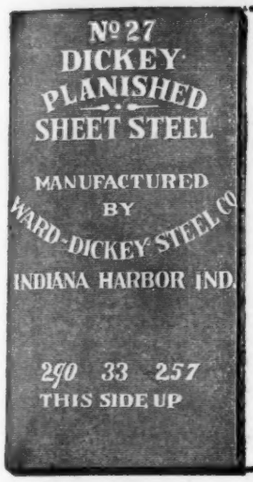
Cornice Brake

WE make a specialty of Cornice Brakes, and build the most up-to-date Cornice Brake now on the market. We can furnish same in any length from 30 inches to 10 feet, and we guarantee our Cornice Brake for No. 20 gauge material and lighter, and with heavy bending attachment for No. 18 gauge.

We also make a complete line of Power Punching Presses.

THE J. M. ROBINSON MFG. CO.

3282 to 3288 Spring Grove Avenue • • • • • CINCINNATI, OHIO



GENUINE DICKEY PLANISHED SHEET STEEL

Is finished under powerful **planishing hammers.** This gives the sheet a **tough working quality,** found in no other make of steel sheet. It retains its color under the most intense heat. Will not break or crack. The ideal sheet for stamping or die work.

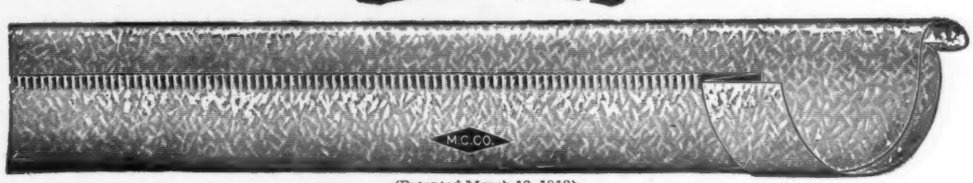
Descriptive matter and prices sent on request.

WARD-DICKEY STEEL CO., Indiana Harbor, Indiana

"DON'T FORGET TO SPECIFY"

WHEN PLACING YOUR SPRING ORDER

GUTTER CRIMPEDGE



(Patented March 12, 1912)

STRONG—RIGID—UNIFORM

— AND —

INTERLOCK CONDUCTOR Pipe

A SEAM THAT WILL NOT BREAK

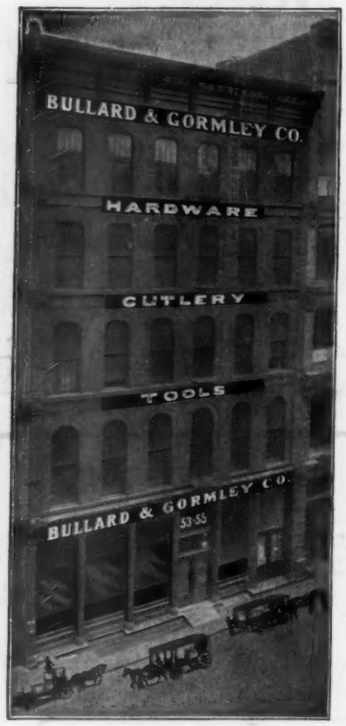
Manufactured Exclusively By

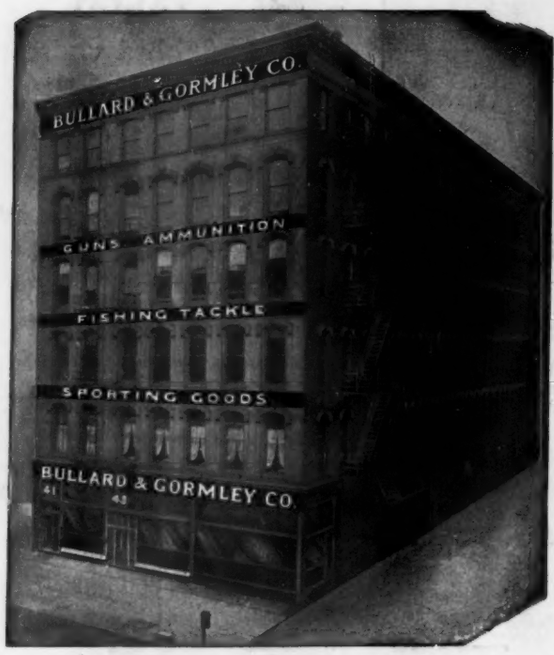
MILWAUKEE CORRUGATING COMPANY

Branch—KANSAS CITY, MO. **MILWAUKEE, WIS.**

WHOLESALE HARDWARE

of the Highest Class at Popular Prices





We issue complete catalogues of the following goods:

Sporting Goods & Fishing Tackle, Cutlery, Mechanics' Tools, Builders' Hardware, General Hardware

Send for our low prices and let us fill your wants

BULLARD & GORMLEY CO.

173-175 N. State St. 8-10 Couch Pl. 7-9 E. Lake Street

CHICAGO, ILL.